

**CONDUCTOR**  
OR Informatics System

USER MANUAL



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This symbol alerts the user that important information regarding the installation and / or operation of this equipment follows. Information preceded by this symbol should be read carefully in order to avoid damaging the equipment.



This symbol warns user that un-insulated voltage within the unit may have sufficient magnitude to cause electrical shock. Therefore, it is dangerous to make contact with any part inside the unit. To reduce the risk of electric shock, **DO NOT** remove cover (or back). There are no user serviceable parts inside. Refer servicing to qualified service personnel.



This symbol cautions the user that important information regarding the operation and / or maintenance of this equipment has been included. Information preceded by this symbol should be read carefully to avoid damage to the equipment.



This symbol denotes the manufacturer.



This symbol denotes the manufacturer's European Community representative.

To prevent fire or shock hazards, do not expose this unit to rain or moisture. Also, do not use this unit's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. The product is designed to meet the medical safety requirements for a patient vicinity device. This equipment/system is intended for use by healthcare professionals only.



#### Safety Compliance:

These products are T.U.V. approved WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1/CAN/CSA C22.2 NO. 60601-1 and ANSI/AAMI ES60601-1.



#### Safety Compliance:

These products meet the requirements of EN 60601-1 so as to conform to the Medical Device Directive 93/42/EEC and 2007/47/EC.



#### WARNING:

The **Fiber Optic Output** module is a CLASS I LASER PRODUCT. DO NOT STARE INTO LASER BEAM

**Power Cord:** Use a hospital grade power cord with the correct plug for your power source. Disconnect the power cord from the AC mains. The power cord is the only recognized disconnect device. The MEDICAL EQUIPMENT should be positioned so that its disconnect device is readily accessible.

The product should be powered from a center tapped circuit when used in the US at voltages over 120 volts. Product is intended for continuous operation.

It is the responsibility of the installer to ensure that the equipment is installed in accordance with applicable hospital, local and national electrical codes.

An equipotentiality post, located on the back of the equipment, may be used for the purpose of bonding the ConductOR's chassis to other equipment to ensure that all devices are at the same potential. Any such bond must be installed in accordance with applicable electrical codes. The equipotentiality (ground) post is shown on the mechanical drawing found on page 3.

#### Recycling:



Follow local governing ordinances and recycling plans regarding the recycling or disposal of this equipment, or contact the Electronic Industries Alliance ([www.eiae.org](http://www.eiae.org))

## Declarations of Conformity

### FCC and Council Directives of European Standards:

This device complies with Part 15 of FCC rules and 93/42/EEC and 2007/47/EC of the Council Directives of European Standards Directive as amended by 2007/47/EC. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable results.

1. Use the specified cables with this device so as not to interfere with radio and television reception. Use of other cables and / or adapters may cause interference with other electronic equipment.
2. This equipment has been tested and found to comply with the limits pursuant to FCC part 15 and CISPR 11. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

### IEC:

This equipment has been tested and found to comply with the limits for medical devices to the IEC 60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

### FCC, Council Directives of European Standards and IEC:

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician for help.

Accessory equipment connected to this monitor must be certified according to the respective IEC Standards (i.e., IEC 60950-1) for data processing equipment and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standard, IEC 60601-1-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of system standard IEC 60601-1-1. Whoever is responsible for securing the monitor to a system needs to insure that the mounting equipment used with this display complies to IEC standard 60601-1. If in doubt, consult the technical services department or your local representative.

## Legal Statement

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Customers are cautioned that system configuration, software, the application, customer data and operator control of the system, among other factors, affect the product's performance. While NDS products are considered to be compatible with many systems, specific functional implementation by customers may vary. Therefore, suitability of a product for a specific purpose or application must be determined by the consumer and is not warranted by NDS.

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## About This Manual

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This manual is designed to assist the user with installation, setup and operation of the **ConductOR** and its associated displays. A list of displays that may be used with the **ConductOR** is in the [Compatible Displays](#) section on the following page.

A numbered tab on the side of the page denotes the beginning of a section.

The functional descriptions in this manual are representative of:

ConductOR:

Part Number: 90T0007

Firmware:

Controller: 58C0101 Version F and later.

Front Panel: 58C0125 Version D and later

Scalar: 58J0039 Version F and later.

Streamer: 58C0124 Version G and later.

Manual Part Number 60G0368 Rev E

## Intended Use and Contraindications

### Intended Use:

This device is intended for use in a medical environment to route high quality video and graphic images .

### Contraindications:

This device may not be used in the presence of flammable anesthetics mixture with air, oxygen or nitrous oxide. Also, it is not intended for life support applications.

No part of this product may come in contact with a patient. Never touch the product and a patient at the same time.

### Warning:

The [Fiber Optic Output](#) module may emit invisible laser radiation from the aperture of its port when no fiber cable is connected. Avoid exposure to laser radiation and do not stare into open apertures.

Condition	Possible Cause	Mitigation
End user cannot view the video data from a connected video source	Incompatibility with video source equipment.	When video source equipment is connected to the ConductOR, the end user must verify that video is passed from the video source through the ConductOR and is displayed correctly on the connected monitors .
External control failure	RS-232 communication failure.	Control unit from front panel touch screen.
ConductOR cannot be powered on.	Defective internal power supply	Bypass the ConductOR by connecting the output of the video source directly to a monitor.

For mission critical applications, we strongly recommend that a replacement unit be immediately available.

## ConductOR Overview

The **ConductOR** has 4 fixed inputs as shown in Fixed Inputs table below. Up to 4 input modules and up to 4 output modules may be added. The drawing on page 3 shows location of the fixed input connectors and the input and output modules. The 24 VDC power out connector provides power, 120 watts maximum, to an external device. The input and out modules are described on pages 5 and 6.

Fixed Inputs	Input Signal	Notes
S-VIDEO IN A / COMP IN A	NTSC or PAL	Only one may be selected at a time.
S-VIDEO IN B / COMP IN B	NTSC or PAL	Only one may be selected at a time.
VGA / SOG	VGA or SOG	Only one of these signals may be applied.
DVI / RGBS / YPbPr	DVI, RGBS or YPbPr	Only one of the signals may be applied. Maximum resolution is: 1920 x 1080 progressive.

## General Information

### Installation:

ConductOR units may be stacked on a equipment carrier, a surgical cart or mounted in a standard 19" rack. Do not block the air vents.

### Compatible Displays:

1. HD displays with Fiber Optic input.
2. HD displays with a DVI input that accepts signals with 720p or greater resolution.
3. HD displays with HD-SDI or 3G-SDI input.

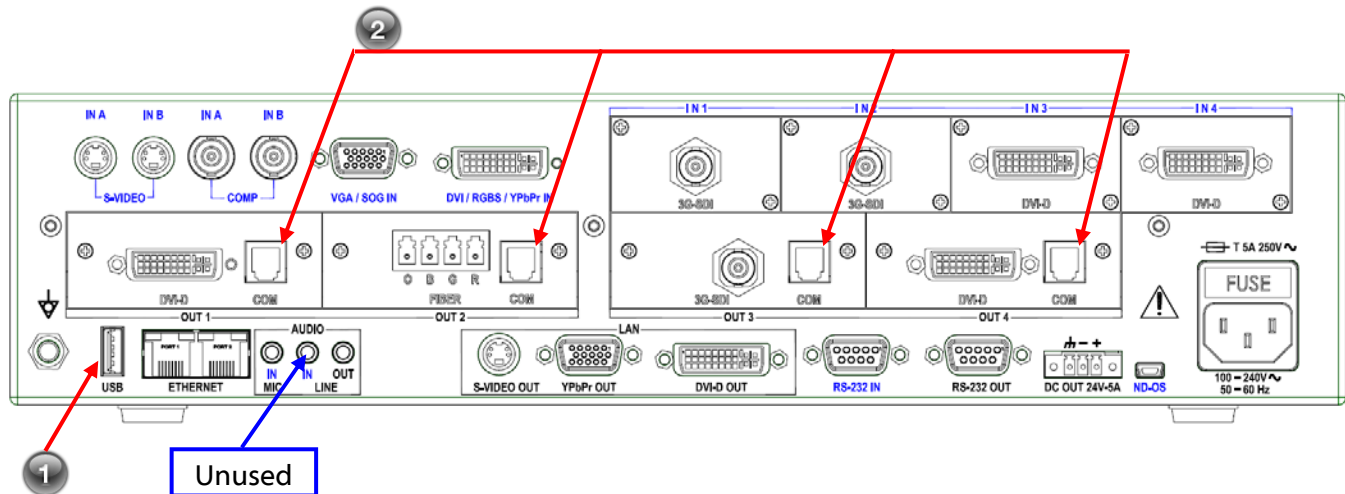
### Control Options:

The ConductOR may be controlled from:

1. Its front LCD touch panel.
2. A PC via the RS-232 port. See page 55 for serial port setup and test details. The [NDS Unified Serial Commands](#) (P/N 60A0156) document contains a complete set of serial commands for the **ConductOR**. Please contact your [NDS sales representative](#) for details.

## Connector Panel

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### Notes:

- There are 8 video inputs, 4 fixed, and 4 removable. Two **S-VIDEO**, two **COMP**, **VGA/SOG IN** and a **DVI/RGBS/YPbPr** input comprise the fixed inputs. The Fixed Inputs table, on the previous page, describes the capabilities and limitations of the fixed inputs.
- Currently 3 types of input modules are available: **3G-SDI**, **DVI-D**, and **VGA**. A maximum of 4 input modules may be installed in any combination.
- Currently 3 types of output modules are available: **FIBER**, **DVI-D** and **3G-SDI**. A maximum of 4 output modules may be installed in any combination.
- AUDIO** accepts an analog input from a microphone (**MIC**). The audio output (**OUT**) is a line level analog output. The signal presented to the **OUT** connector is intended for use with headphones. If a speaker is required this output may be connected to an amplifier or amplified speaker.
- When the unit is in receive mode, **YPbPr OUT** outputs the video data that is inbound to the **Streamer**. This data may viewed by selecting **LAN** as the input for the active display. See **Select Input Screen** on page 10 and **Primary and Secondary Input Screens** on page 11. **DVI-D OUT** outputs video data from the selected **Stream Source**. See **IP Streaming** on page 18.
- Audio data is retrieved from the **ETHERNET** connection, converted to analog and presented to the **OUT** connector.
- The **ETHERNET** port has two connectors, allowing multiple **ConductORs** to be connected together and then be connected to a PC or network via a single cable.
- S-VIDEO OUT** outputs standard definition video data from the selected **Stream Source**. See **IP Streaming** on page 18.

## USB Mass Storage Device

- The **ConductOR's** save and restore functions cannot be used until a USB Flash Drive (P/N 46Z0002) is installed in its **USB** port.

## COM Connector

- Each output module has an RJ-22 **COM** connector which allows the **ConductOR** to control a **Radiance** or **EndoVue** display via its RS-232 port. The RJ-22's pinout and a **ConductOR** to **Radiance** or **EndoVue** cable wiring diagram are on page 58. The required serial commands document is described in the **General Information** section on the previous page.

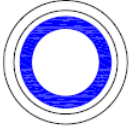


**Equipotentiality:**

This symbol appears next to the **ConductOR**'s potential equalization connector.

**Power Switch:**

The power switch is push on / push off. When the switch is off the ring around the center portion is white. When the switch is on, the center portion is depressed and the ring is illuminated blue. The illustration shows the switch in its **ON** state.



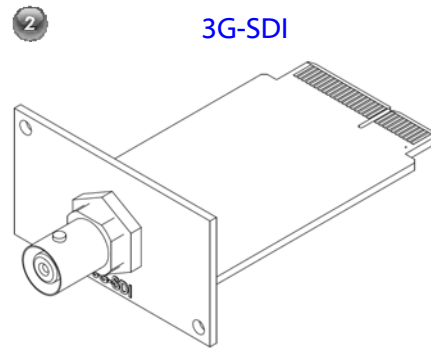
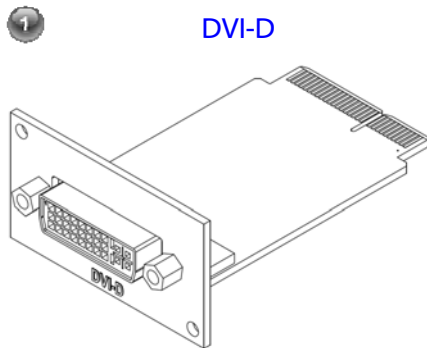
## Input Modules

### Input Modules:

Two types of input modules are available: **DVI-D** and **3G-SDI**

- 1 The **DVI-D** input module accepts DVI signals up to 1920 x 1200 progressive at 60Hz.
- 2 The **3G-SDI** input module accepts SDI signals up to 1920 x 1080 progressive at 60Hz.

The input modules, shown below, may be installed in any of the **IN** (see page 3) card slots in any combination and in any order. Up to four input modules may be installed.



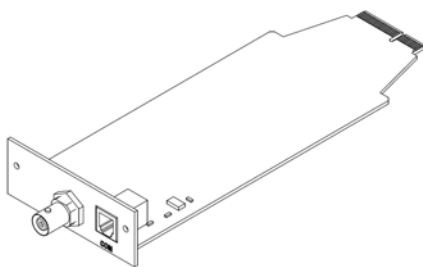
## Output Modules

### Output Modules:

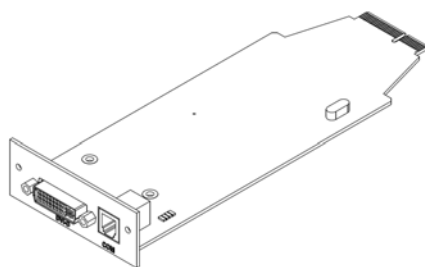
Three types of output modules are available: **3G-SDI**, **DVI-D** and **Fiber Optic**.

#### Notes:

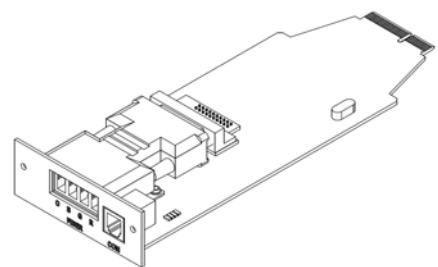
1. The output modules, shown below, may be installed in any of the **OUT** (see page 3) card slots in any combination and in any order. Up to four output modules may be installed.
2. The **DVI-D** and **Fiber Optic** output modules output signals of: 1280 x 720 progressive, 1920 x 1080 progressive or 1920 x 1200 progressive at 60Hz. **Note:** When a **DVI** or **Fiber Optic** output module is selected as the streaming source its output is limited to 1920 x 1080p.
3. The **3G-SDI** output module outputs signals of: 1280 x 720 progressive, 1920 x 1080 Interlaced or 1920 x 1080 progressive at 60Hz.
4. **OUT 4** is slaved to **OUT 3**. Therefore, installing a **DVI-D** or **Fiber Optic** module in one of them and a **3G-SDI** module in the other limits the output of the **DVI-D** or **Fiber Optic** module to 720p or 1080P. the **3G-SDI** module may be set to 720p, 1080i or 1080p. Setting the output resolution is described on page 15.



3G-SDI



DVI-D



Fiber Optic

**WARNING:**  
CLASS I LASER PRODUCT. DO  
NOT STARE INTO LASER BEAM

## Module Removal and Installation



The **ConductOR** must be turned off prior to installing or replacing input or output modules.

### Input Module Removal:

Use a number 1 Phillips screwdriver to loosen, but not remove, the screws located on the upper left and lower right corners of the module's mounting plate. When the screws are clear of the chassis, remove the blank plate or module by gripping the screws and pulling the plate or module out.

### Output Module Removal:

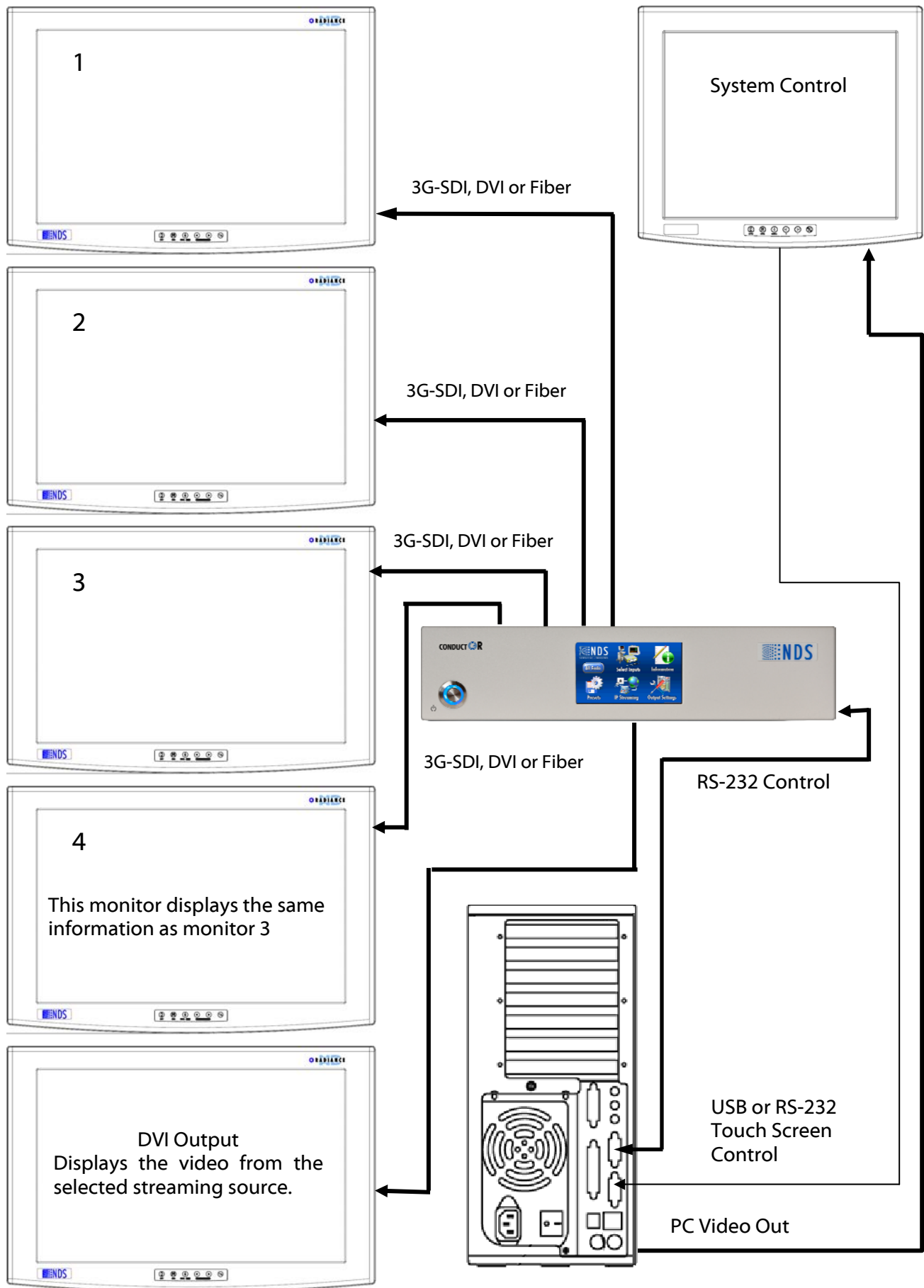
Use a number 1 Phillips screwdriver to loosen, but not remove, the screws located on the left and right sides of the module's mounting plate. When the screws are clear of the chassis, remove the blank plate or module by gripping the screws and pulling the plate or module out.

### Installation:

Slide the new module into the chassis until it contacts the connector, then push gently until the module seats. The module is correctly seated when its mounting plate is flush with the chassis's back panel. Thread the module's screws into the chassis until they touch the mounting plate, then tighten each screw by turning it another quarter turn. When an input or output module is added, replaced, or removed, you must restore **Factory Defaults** (page 16) in order for the **ConductOR** to recognize the new module configuration.

## Typical System Configuration

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## Startup Screen

The **Startup** screen, shown below, appears as soon as power is applied to the **ConductOR** and is displayed until the **ConductOR**'s Power On Self Test (POST) finishes. The POST takes approximately 20 seconds to complete. After the POST finishes, the home screen is displayed. **Home** screen is shown on the following page.



## Home Screen

The **Home** screen, shown below, is the starting point for all front panel operations. The icons on the home screen and their functions are briefly described below and described in greater detail on the following pages.



**Select Inputs** Allows the user to select an output and its primary and / or secondary input. Touch this icon to open the **Select Inputs** screen shown on the following page.



**Information** Provides information about the **ConductOR**. The user may save the **ConductOR**'s configuration to a USB 'Memory Stick', load the saved configuration from a USB 'Memory Stick', change the **Unit ID**, restore the factory defaults, or update the scalar firmware. Touch this icon to open the **Information** screen. The **Information** screen is discussed on page 16.



**Output Settings** Provides a means to set the output resolution of each module. **Note:** If output modules 3 and 4 are DVI or Fiber and SDI then the output resolution is limited to 720p or 1080p for the DVI or Fiber output. The SDI output may be set to 720p, 1080p or 1080i. Touch this icon to open the **Output Settings** screen shown on page 15.



**IP Streaming** This screen is associated with network operations and requires a network connection to be effective. Touch this icon to open the **IP Streaming** screen shown on page 18.



**Presets** System Presets allows up to 9 system configurations to be saved and restored. The user may enter a different name for each of the 9 presets. Touch this icon to open the **System Presets** screen shown on page 22.

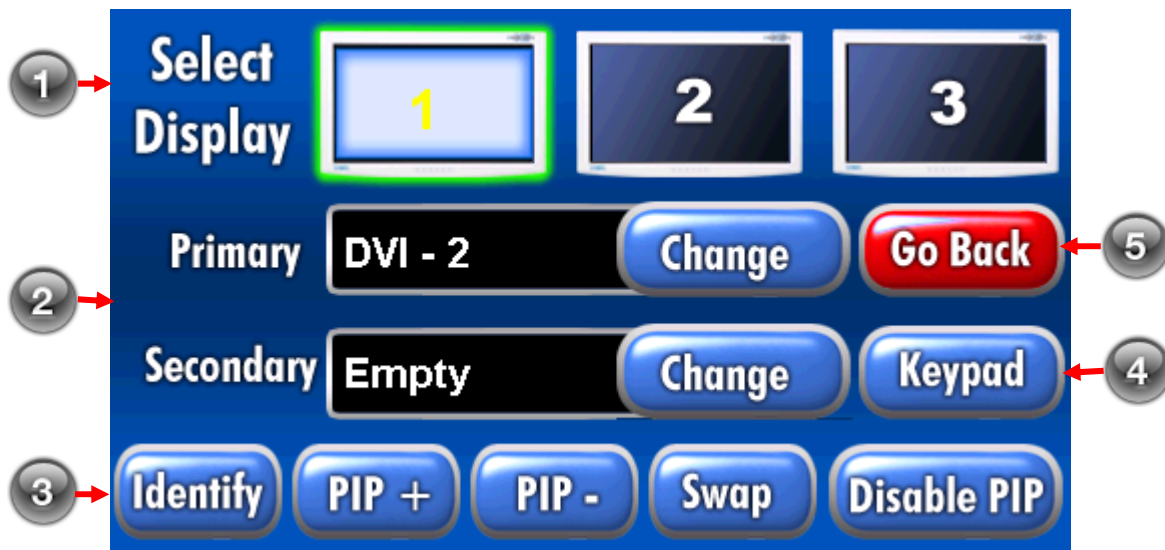


**All Endo** Routes the signal connected to input module 1 to all outputs.



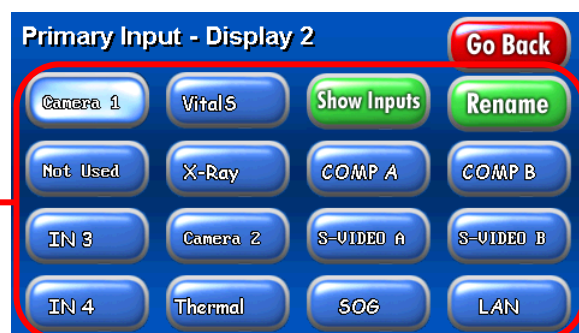
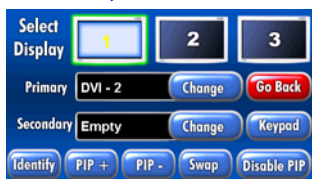


## Select Inputs Screen



- ① The active output is the highlighted display icon on the **Select Display** row. To select a different output touch its display icon.
- ② The selected output's current input sources are shown in the **Primary** and **Secondary** windows. The **Primary Input** and **Secondary Input** screens are shown on the following page. Touch the **Go Back** button to return to the home screen.
- ③ Touching the **Identify** button displays a 1, 2 or 3 on the monitor connected to the corresponding output. **Note:** As output 4 is slaved to output 3, a 3 will be shown on monitors 3 and 4. The **PIP +**, **PIP -**, **Swap** and **Disable PIP** buttons are described on page 13.
- ④ Touching the **Keypad** button opens the Keypad screen and allows access to the ConductOR features that are not frequently used. The **Keypad** buttons are described on page 14.
- ⑤ Touch the **Go Back** button to return to the **Home** screen.

## Primary and Secondary Input Screens



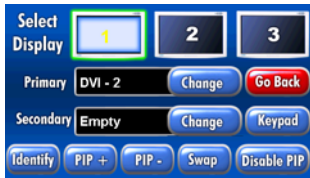
- 1 To select a primary input, touch the **Change** button on the **Primary** row. The illuminated button on the **Primary Input** screen is the current input. Select a **Primary** input by touching the button associated with that input.
- 2 To select a secondary input, touch the **Change** button on the **Secondary** row. A grayed out button on the **Secondary Input** screen may not be selected as a secondary input.
- 3 Touching the **Show Names** button to changes its legend to **Show Inputs**, and displays the user assigned input names.
- 4 To change an assigned name, touch the **Rename** button. Renaming is described on the following page.
- 5 Touch the **Go Back** button to return to the **Select Inputs** screen.

## Rename Inputs

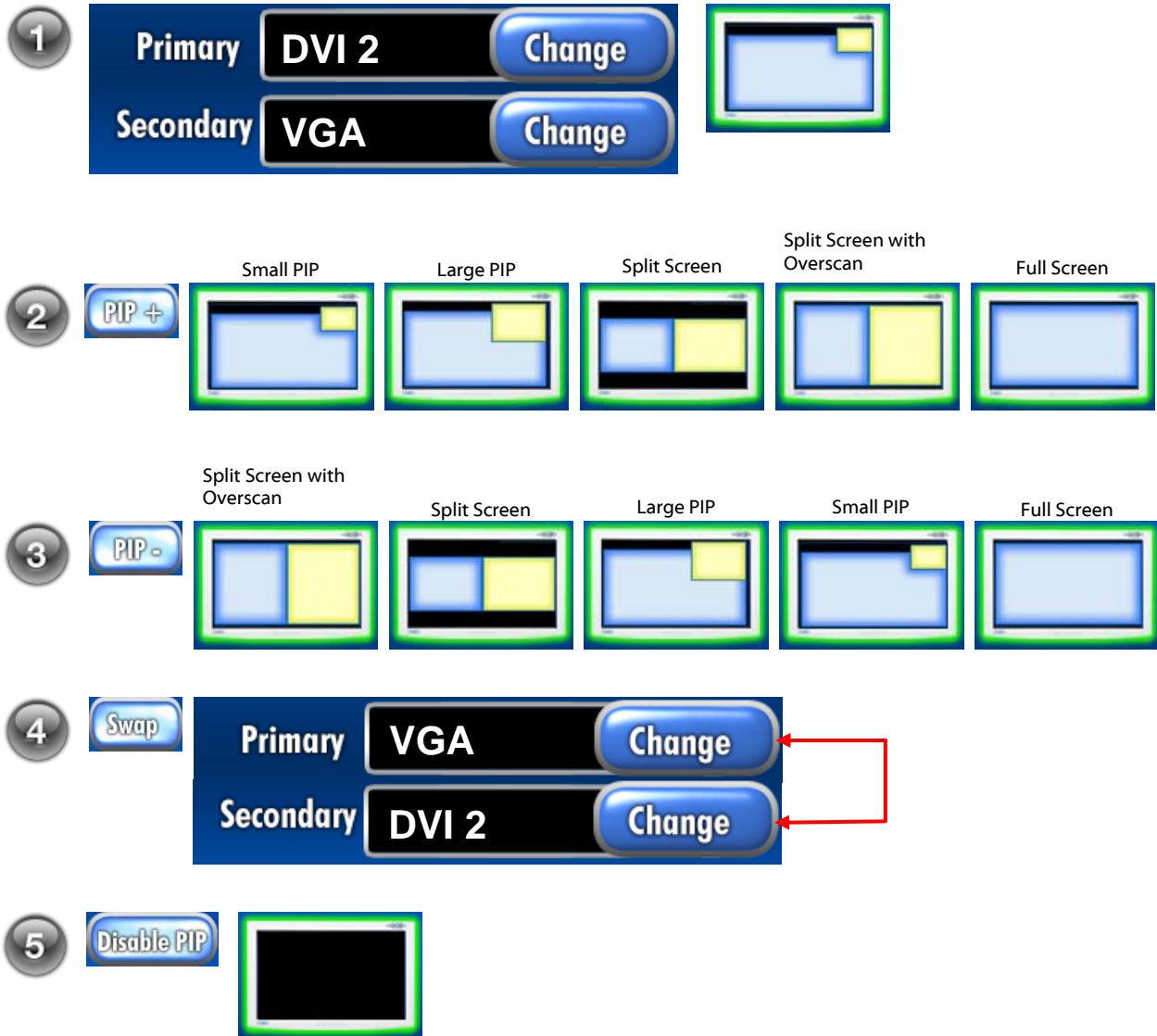
- 1 To rename the input buttons, touch the **Rename** button.
- 2 The **Select Input To Rename** screen is displayed.
- 3 Touch the button to be renamed, the selected button is surrounded in green.
- 4 Touch the **Rename** button to display the **Edit Input Name** screen.
- 5 Touch the **Clear** button to delete the current name
- 6 Assign new name to the selected input by touching the buttons whose letters correspond to the letters in the name you wish to enter. The name appears in the **New Input Name** window. A button may have to be touched as many as 7 times in order to select the desired character. For example touching button 2 causes its characters to be displayed as: 2, A, a, B, b, C, c. to select an upper case B, touch the button 4 times. Pausing 2 seconds moves to the next character position. Touch the **Space** button to enter a space between 2 words. Touch the **↵** button delete the last character entered.
- 7 Touch the **OK** button to save the input name and return to the **Select Input To Rename** screen.
- 8 Touch the **Cancel** button to return to the **Select Input To Rename** screen without changing the name of selected input button.



## PIP, Swap and Disable PIP Buttons



The **PIP +**, **PIP -**, **Swap** and **Disable PIP** buttons are located on the bottom row of the **Select Inputs** screen (page 10) and are effective only when a secondary input has been selected. Select a secondary input as described on page 11.



- ① A source should be displayed in the **Primary** and **Secondary** windows and a small PIP rectangle appears in the upper right corner of the selected display icon. An example is shown above.
- ② Touching the **PIP +** button causes the button to illuminate momentarily and the PIP size in the icon changes. Each time the **PIP +** button is touched the PIP icon changes as you cycle through the PIP sizes.
- ③ Touching the **PIP -** button causes the button to illuminate momentarily and the PIP size in the icon changes. Each time the **PIP -** button is touched the PIP icon changes as you cycle through the PIP sizes.
- ④ Touch the **Swap** button to exchange the text in the **Primary** and **Secondary** rows. The primary and secondary images displayed on the attached monitor are swapped.
- ⑤ The secondary input may be cleared by touching the **Disable PIP** button.

## Keypad Screen

On the **Select Inputs** screen (page 10), touch the **Keypad** button to display the **Keypad** screen. To observe the effect of changing an output's parameters, a monitor must be connected to the output whose parameters are being changed. Changing the **ConductOR**'s parameters does not change the connected monitor's parameters. **Note:** We recommend that the connected monitor's parameters not be changed as this may degrade the displayed image.



Touch the **Identify** button to identify the output whose parameters are to be adjusted, then touch the corresponding display icon to select that output.



When you touch any of the keypad buttons, the button and the LED above it turn green until you release the button.



Touch the **MENU** button to open the OSD. The **SCROLL** and ◀ or ▶ button usage is detailed starting on page 26.



Touch the **SCROLL** button to select the parameter you want to change.



Touch ◀ or ▶ to select the menu or parameter you want work with.



The **Brightness / Contrast** button usage is detailed on page 25.



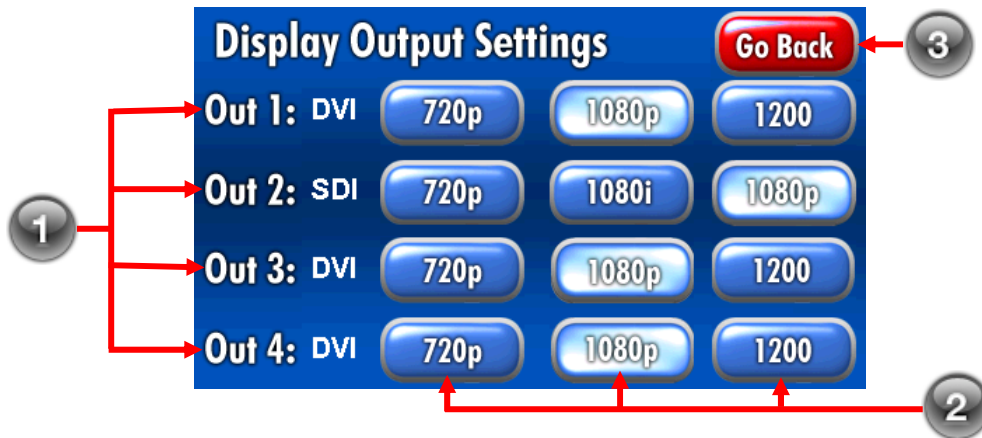
Touch the **Go Back** button to return to the **Select Inputs** screen.

Changes made via the keypad are retained when the **ConductOR**'s power is cycled.



## Output Settings Screen

Touch the **Output Settings** icon on the **Home** screen (page 9) to display the **Display Output Settings** screen.



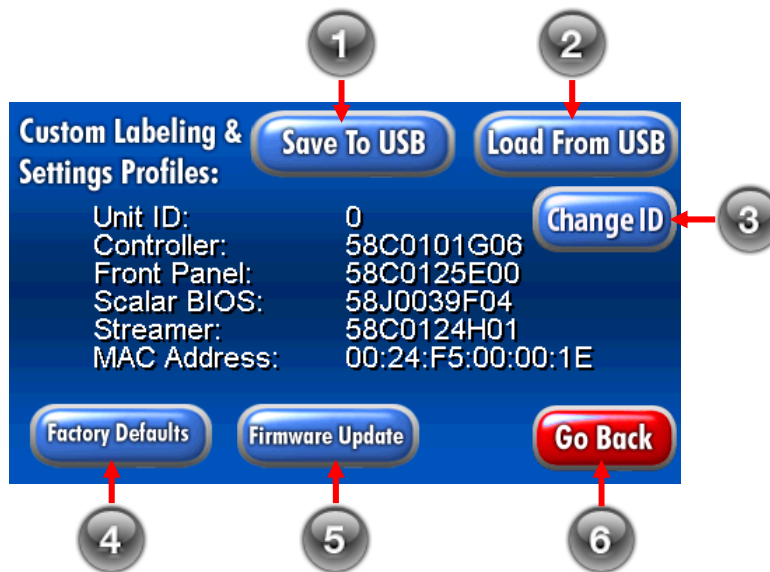
- 1 Choose **OUT 1**, **OUT 2**, **OUT 3** or **OUT 4**.
- 2 Select the desired output setting by touching the **720p**, **1080i**, **1080p** or **1200** button. The **1080i** option is available for **SDI** output modules only. The **1200** option is available for **DVI** and **Fiber Optic** output modules only. **Note:** If outputs 3 and 4 are **DVI** or **Fiber** and **SDI**, then the **DVI** or **Fiber** output resolution cannot be set to **1200**.
- 3 Touch the **Go Back** button to return to the **Home** screen.





## Information Screen

Touch the **Information** icon on the **Home** screen (page 9) to display the **Information** screen. The **Information** screen contains general information about your **ConductOR**.



- ① Touching the **Save To USB** stores the current configuration to a [USB Drive](#).\*
- ② Touching the **Load From USB** button installs a saved configuration from a [USB Drive](#).\*
- ③ **Unit ID** (addressing) is used when 2 or more **ConductORs** are to be controlled from a single PC serial port. Each time the **Change ID** button is touched **Unit ID** is incremented by 1 until it reaches a value of 31. Touching the **Change ID** button when the **Unit ID** is 31, sets **Unit ID** back to 0. **Unit ID** and [Systems](#) are discussed on the following page.
- ④ Touching the **Factory Defaults** button restores the **ConductOR's** factory settings.
- ⑤ Touching the **Firmware Update** prepares the **ConductOR** to receive a firmware update.
- ⑥ Touch the **Go Back** button to returns to the **Home** screen.

### \*Notes:

1. To create a backup copy of the **ConductOR's** configuration, install a [USB Drive](#) in the **ConductOR's** [USB](#) port (See page 3 for the location of the [USB](#) port.) before using the **Save To USB** function. When the configuration has been saved, return to the [Home Screen](#) (page 9) before removing the [USB Drive](#). Returning to the [Home Screen](#) closes the [USB Drive](#) allowing it to be safely removed from the **ConductOR**.
2. To restore a backup configuration insert its [USB Drive](#) into the **ConductOR's** [USB](#) port, then touch the **Load From USB** button. Return to the [Home Screen](#) before removing the [USB Drive](#) from the **ConductOR**.
3. The **Save To USB** and **Load From USB** functions are separate from the **Store** and **Apply** functions on the [System Presets Screen](#). See page 22.

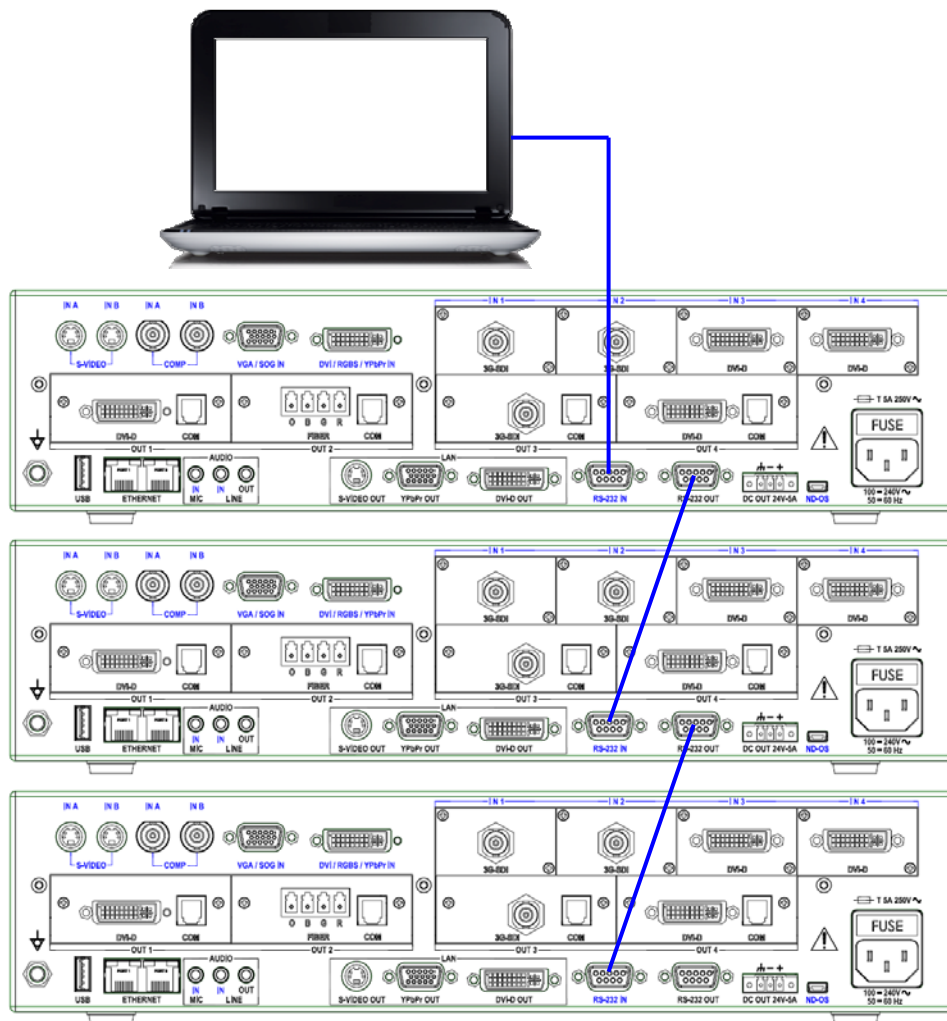
## Unit ID and Systems

When multiple **ConductORs** are controlled via a single RS-232 serial port, their **Unit IDs**, may be set:

- 1 **Manually:** To set the **Unit ID** manually, touch the **Change ID** button until the desired **Unit ID** appears. **Unit ID** increments once each time the **Change ID** button is touched. Each **ConductOR** must have a unique Unit ID. The **Unit IDs** do not have to be sequential.
- 2 **Automatically:** To automatically assign **Unit IDs** to a group of **ConductORs**, all of the **ConductORs** in the group must be connected to each other, as shown below, and all of them must be powered on. The group must be connected to a PC's serial port. **Unit IDs** are assigned sequentially via a user supplied program running on the PC. The unit connected directly to the PC will be assigned the lowest **Unit ID**. The required serial commands are in the **NDS Unified Serial Commands** (P/N 60A0156) document. See page 2 for availability.

### Systems:

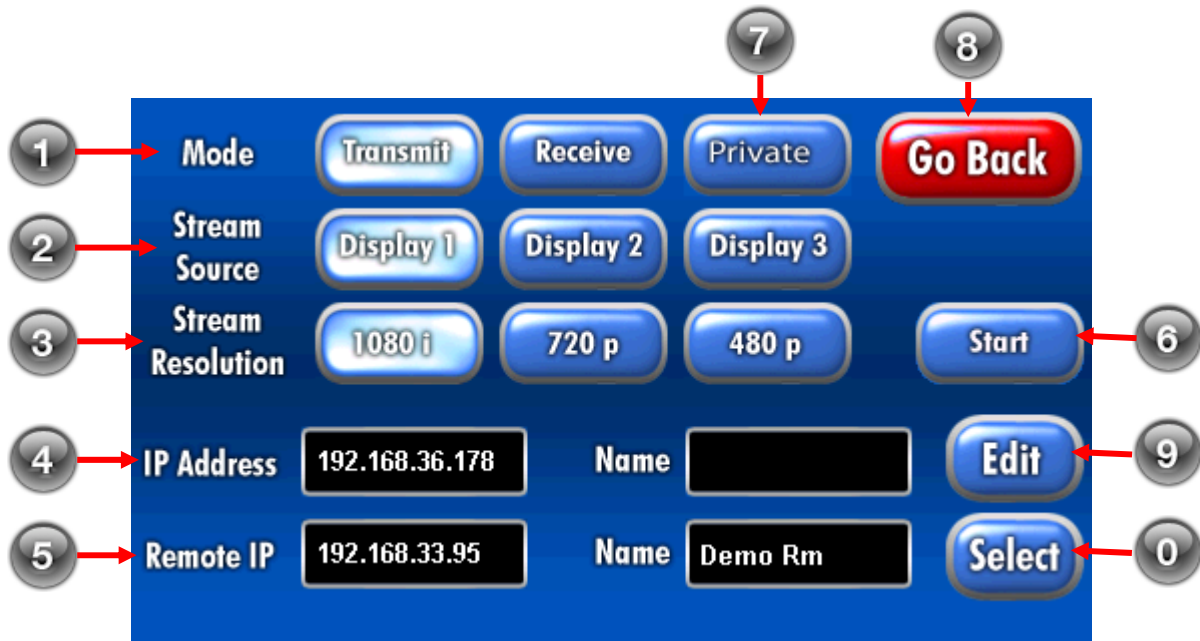
A **ConductOR** system may support as few as **1** unit or as many as **32** units, and is software controlled via PC serial port. A 3 **ConductOR** system is illustrated below. In a single unit system, the **ConductOR's Unit ID** may be set to any value between **0** and **31**.



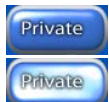


## IP Streaming Screen

Touch the **IP Streaming** icon on the **Home** screen (page 9) to display the **IP Streaming** screen. If the “Streaming subsystem is initializing” message appears, it will clear in approximately 30 seconds and the **IP Streaming** screen will be displayed.



- ① On the **Mode** row, touch **Transmit** to send data to the network or touch **Receive** to receive data from the network. **Note:** When **Receive** mode is selected, **Stream Resolution** has no effect and **Stream Source** is disabled.
- ② On the **Stream Source** row touch **Display 1**, **Display 2** or **Display 3** to select the output whose data will be sent to the network.
- ③ Set **Stream Resolution** to **1080i**, **720p** or **480p** to match the receiving device’s capabilities.
- ④ The **IP Address** may be set via DHCP (default) .
- ⑤ The **Remote IP** address is set using the **Select** button. See item 0 below.
- ⑥ The **Start** button is used to establish an IP link between two **ConductOR**’s. The text in the **Remote IP** window turns green when the link is established. **Note:** The **Start** button is used only for connecting two **ConductOR**’s together.
- ⑦ Touching the **Private** button turns the streaming video and audio on or off. The default is on.



Video and audio are on

Video and audio are off

- ⑧ Touch the **Go Back** button to return to the **Home** screen.
- ⑨ Touching the **Edit** button displays the IP address select screen. This screen gives the user the option of having the **ConductOR**’s IP address assigned automatically (DHCP) or manually assigning an IP address. This screen is discussed on the following pages.
- ⑩ Touching the **Select** button displays the **Connect to Remote** IP screen. This screen allows the user to assign up to 9 remote IP address, or select a previously assigned IP address and connect to it. The screen is discussed on page 21.

## DHCP

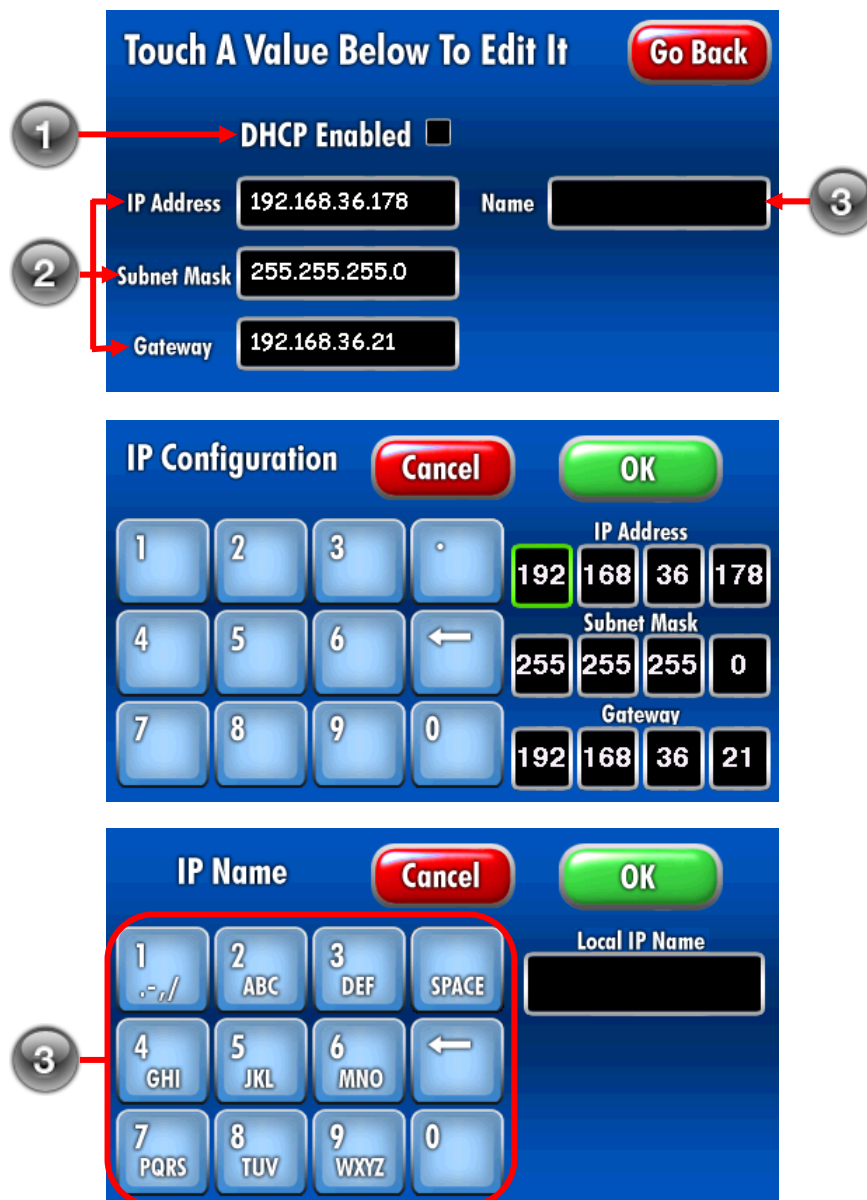
- 1 If **DHCP Enabled** is checked, the **ConductOR**'s IP address will be automatically assigned by the network to which it is connected. Touching **DHCP Enabled** places a ✓ in the box to the right of **DHCP Enabled**. Touching **DHCP Enabled** again removes the ✓.
- 2 When the **DHCP Enabled** box has a ✓, **IP Address**, **Subnet Mask**, **Gateway**, and **Name** are disabled.
- 3 Touch **Go Back** to return to the **IP Streaming** screen.

The screenshot shows a blue-themed configuration screen titled "Touch A Value Below To Edit It". At the top right is a red "Go Back" button. Below the title, there is a section for "DHCP Enabled" with a green checkmark icon. Below this are four input fields: "IP Address" (192.168.36.178), "Name" (empty), "Subnet Mask" (255.255.255.0), and "Gateway" (192.168.36.21). Red arrows and numbered callouts (1, 2, 3) indicate the steps: 1 points to "DHCP Enabled", 2 points to the "Subnet Mask" field, and 3 points to the "Go Back" button.

Field	Value
DHCP Enabled	✓
IP Address	192.168.36.178
Name	
Subnet Mask	255.255.255.0
Gateway	192.168.36.21

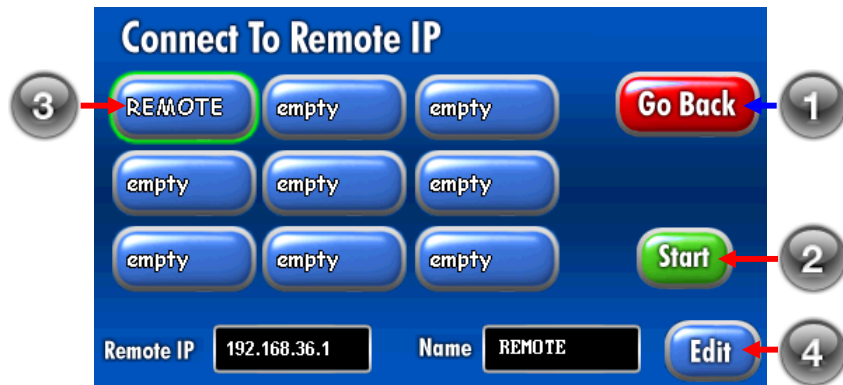
## Manual IP Address Assignment

- 1 To manually assign an IP address or name to the **ConductOR**, touch **DHCP Enabled** to turn off the ✓
- 2 Touch the **IP Address**, **Subnet Mask**, or **Gateway** window to display the **IP Configuration** screen. The **IP Configuration** screen consists of a keypad, 4 IP Address, 4 Subnet Mask, and 4 Gateway windows. The active window is surrounded by a green ring. When the **IP Address** window is touched, the **IP Configuration** screen will appear as shown below. To change the contents of the first **IP Address** window, touch the ⬅ button three times to clear the window. A new IP address section may then be entered by touching the number keys associated with the number you want to enter.
- 3 To assign a name to the **ConductOR**'s IP address touch the **Name** window to display the **IP Name** screen. Enter the name by touching the buttons whose letters correspond to the letters in the name you wish to enter. A button may have to be touched as many as 7 times in order to select the desired character. For example touching button 2 causes its characters to be displayed as: 2, A, a, B, b, C, c. to select an upper case B, touch the button 4 times. Pausing 2 seconds moves to the next character position. Touch the ⬅ button to delete the last character entered.

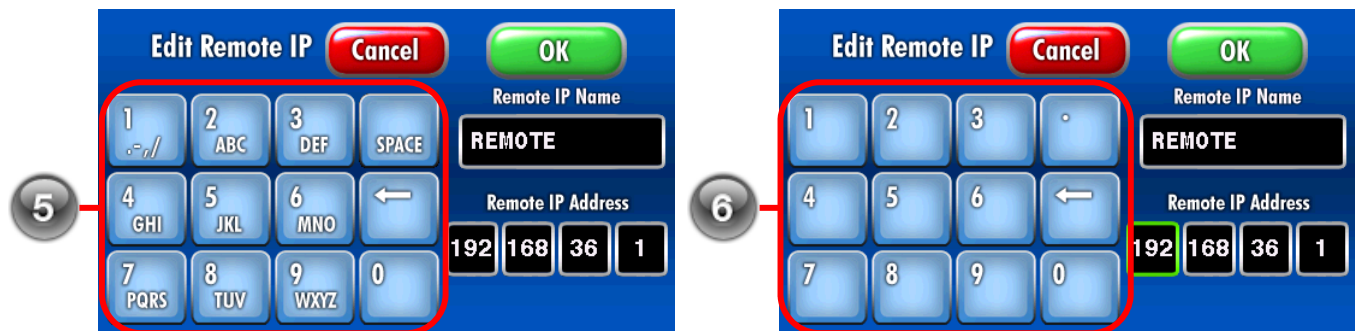


## Connect To Remote IP Screen

- ① Touch this button to return to the previous page.
- ② This button has the same function as the **Start** button described in item 6 on page 18.
- ③ The active button is surrounded in green.
- ④ Touch this button to change the name and IP address assigned to the button surrounded in green.



- ⑤ To assign a name to the remote **ConductorOR** touch the [Remote IP Name](#) window. Enter the name by touching buttons whose letters correspond to the letters in the name you wish to enter. A button may have to be touched as many as 7 times in order to select the desired character. For example touching button 2 causes its characters to be displayed as: 2, A, a, B, b, C, c. to select an upper case B, touch the button 4 times. Touch the ← button to delete the last character entered. Pausing 2 seconds moves to the next character position.
- ⑥ Touch the first window under the [Remote IP Address](#) legend, the window outline turns green. Enter the first 3 digits of the remote IP address, then touch the “•” button to move to the next window. If you don’t need to change the entire IP address, touch the window that contains the portion of the IP address that you want to change.





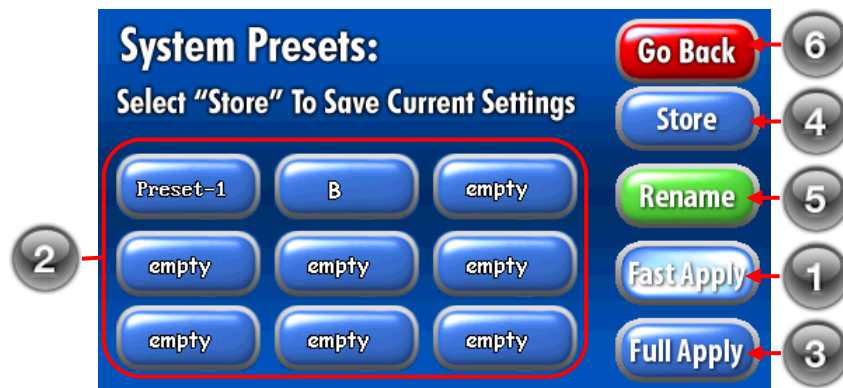


## System Presets Screen

Touch the **Presets** icon on the **Home** screen (page 9) to display the **System Presets** screen. If the “Streaming subsystem is initializing” message appears, it will clear in approximately 30 seconds and the **System Presets** screen will be displayed.

System Presets are saved to and restored from a **USB Drive**. See page 16 for information about creating and restoring a backup configuration.

- 1 The System Presets screen opens with **Fast Apply** selected. **Fast Apply** does not include **On Screen Display** parameters. See pages 26 through 31.
- 2 Touching any preset button not named **Empty** applies the configuration assigned to that button.
- 3 To apply all parameters touch **Full Apply**, then touch any preset button not named **Empty**.
- 4 Store the current configuration by touching the **Store** button, then touch any preset button named **Empty**. When the configuration has been stored, the preset button name changes to **Preset-** and a number from 1 to 9.
- 5 Assigned preset buttons may be renamed. Renaming is discussed in 7 through 9 below.
- 6 Touch the **Go Back** button to return to the **Home** screen.



- 7 Assign a new name to the selected preset by touching the buttons whose letters correspond to the letters in the name you wish to enter. The name appears in the **Preset Name** window. A button may have to be touched as many as 7 times in order to select the desired character. For example touching button 2 causes its characters to be displayed as: 2, A, a, B, b, C, c. to select an upper case B, touch the button 4 times. Pausing 2 seconds moves to the next character position. Touch the button to delete the last character entered.
- 8 The **OK** button saves the name on the selected preset button and returns to the **System Presets** screen.
- 9 The **Delete Preset** button deletes the name assigned to the selected preset and returns to the **System Presets** screen.
- 0 The **Cancel** button returns to the **System Presets** screen without saving the preset name.



## Basic Operation

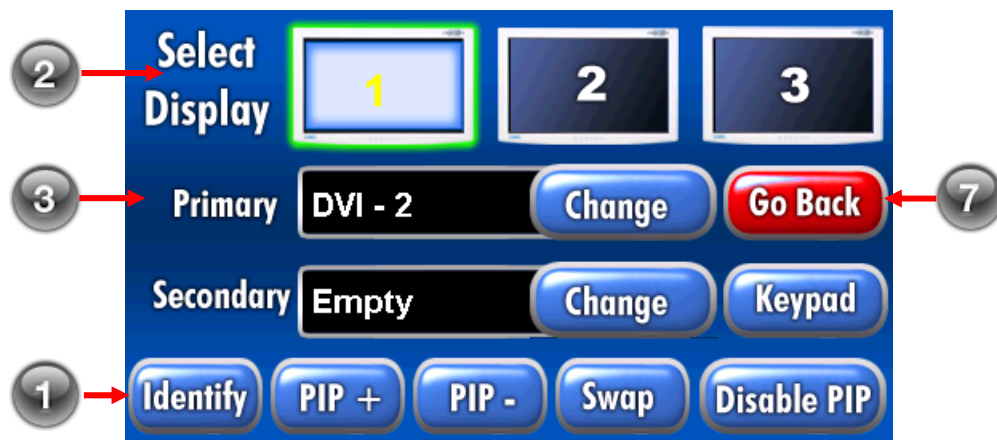
This section describes the basic operation of the **ConductOR**.



### Input Selection

Select a primary input by touching the **Select Inputs** icon, shown below, on the **Home** screen (page 9)

- 1 Touch the **Identify** button, a yellow number appears on each display connected to the **ConductOR**. The number clears after 5 seconds. Displays connected to **OUT 3** and **OUT 4** will show a 3.
- 2 On the **Select Display** row, touch the **Display 1** icon. **Display 1** is used for illustration.
- 3 On the **Primary** row, touch the **Change** button.
- 4 The **Primary Input** screen is displayed.
- 5 On the **Primary Input** screen select the input and touch its button. The **DVI 2** button is used for illustration.
- 6 Touch the **Go Back** button on the **Primary Input** screen to return to the **Select Inputs** screen.
- 7 Touch the **Go Back** button on the **Select Inputs** screen to return to the **Home** screen.



## PIP and Swap

### Selecting a secondary (PIP) image:



Touch this button on the **Secondary** row of the **Select Inputs** screen (page 23) to open the **Secondary Input** screen, shown below. Touch the input button whose data you want to display as the secondary (PIP) image. A small PIP image appears in the upper right corner of the display (see **Small PIP** below). ① A “grayed” out button may not be selected as a secondary input.



Touch this button to return to the **Select Inputs** screen.



### Controlling the PIP image:



The secondary (PIP) image size is controlled by touching **PIP +** and **PIP -** buttons on the **Select Inputs** screen (page 23). Touching the **PIP +** button will step to the next larger PIP image until only the primary image (See **Full Screen** below) is visible. Touching the **PIP +** button again will display a **Small PIP** image in the upper right corner of the display. The **PIP -** button reverses the **PIP +** operation.

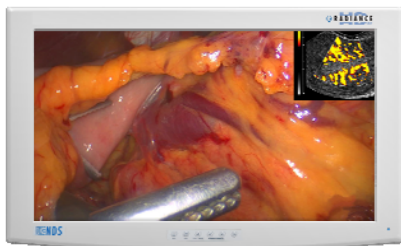


Touching the **Swap** button (page 23) will exchange the primary and secondary inputs on the monitor. Touching the **Swap** button a second time will restore the inputs to their original locations. It is not necessary for both images to be displayed in order to swap primary and secondary images.



Turn the PIP image off by touching the **Disable PIP** button (page 23).

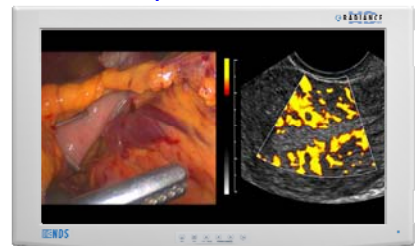
Small PIP



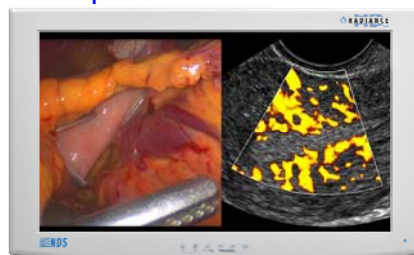
Large PIP



Split Screen



Split Screen Overscan



Full Screen Primary



## Image Adjustments

Select the **Keypad** screen as described on page 14.



Touch this button to identify the output you want to adjust. **Note:** The identify function requires that a monitor be connected to at least one of the four outputs.



On the **Select Display** row touch the display icon that corresponds to the output whose brightness and / or contrast will be adjusted, connect a monitor to the output that will be adjusted. The **Keypad** screen below shows output 1 selected.

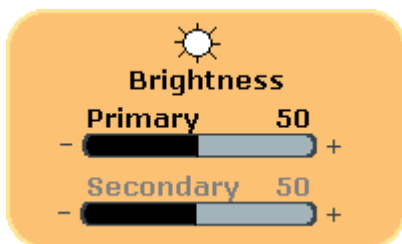
Follow the [Adjust Brightness](#) and / or [Adjust Contrast](#) procedure, below, to adjust the brightness and / or contrast of the selected output. To adjust another output, identify it, then touch its display icon.



Touch this button to return to the **Select Inputs** screen (page 10)



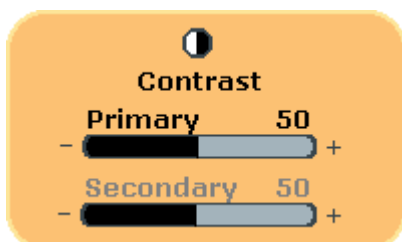
### Adjust Brightness



Touch the **Brightness / Contrast** button to display the Brightness control menu. Touch the ◀ or ▶ button to adjust **Primary** brightness. When a **PIP** image is visible, touch the **Brightness / Contrast** button again to access the **Secondary** brightness control.

Setting the brightness too high or too low will decrease the amount of visible grayscales.

### Adjust Contrast



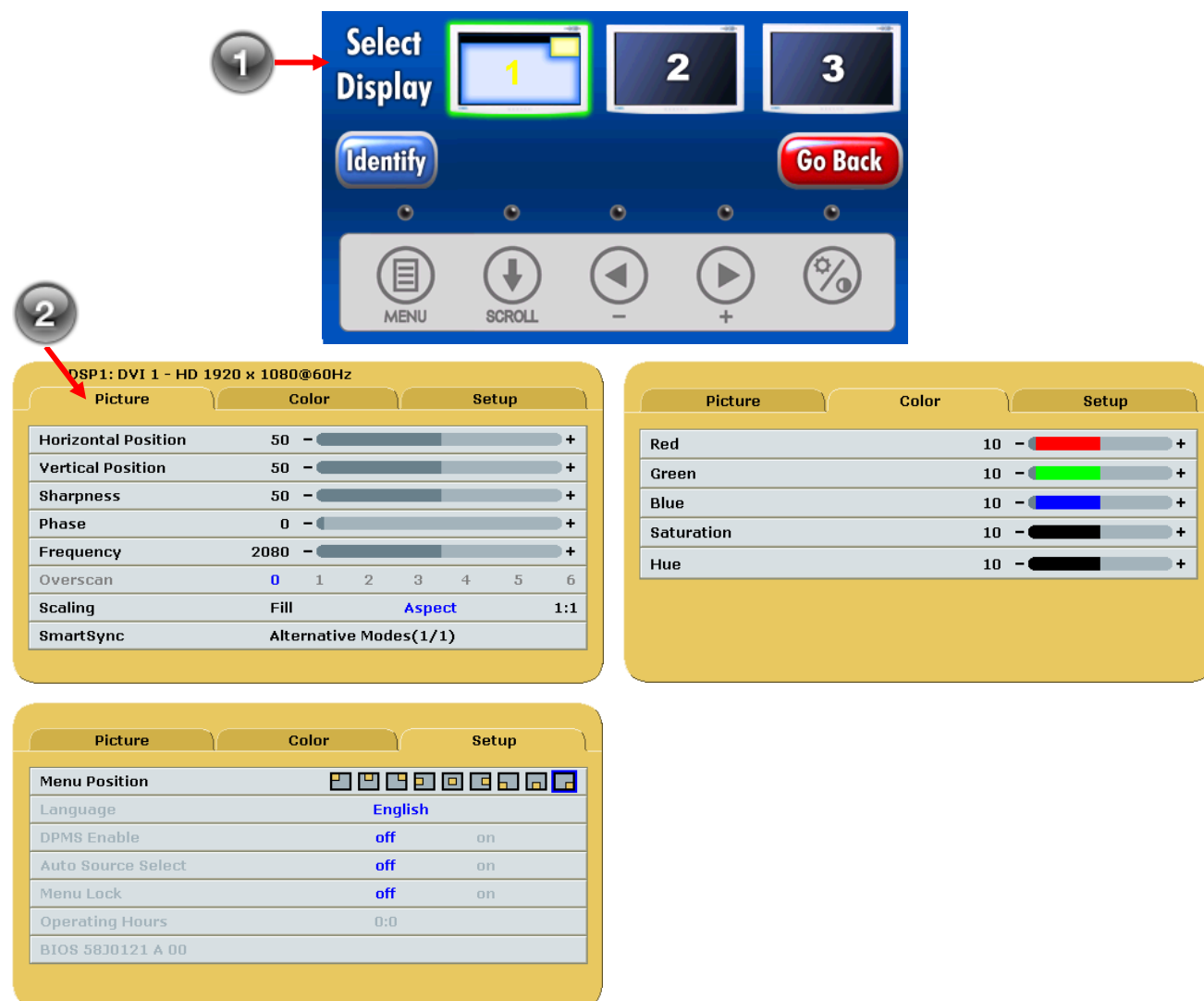
Touch the **Brightness / Contrast** button twice, three times when a PIP image is visible, to display the Contrast control menu. Touch the ◀ or ▶ button to adjust Primary contrast. When a **PIP** image is visible, touch the **Brightness / Contrast** button again to access the Secondary contrast control.

Setting the contrast too high or too low causes loss of some grayscales. Color saturation may appear incorrect.

## On Screen Display Overview

Select the **Keypad** screen as described on page 14.

- 1 On the **Select Display** row touch the display icon for the output whose parameters will be adjusted.
- 2 Touch the **MENU** button once to open the **On Screen Display (OSD)**. The **OSD**'s default location is the lower left corner of the monitor connected to the selected output. The active (**DISP 1**, **DISP 2**: or **DISP 3**:) output's, primary input is shown in black at the top left of the **OSD**. If there is an active secondary input, it will be shown in gray at the top right of the **OSD**. The four available **OSD** menus are: **Picture**, **Color**, **Setup**, **Defaults**
- 2 The **OSD** opens with the **Picture** menu displayed. The menus are shown below. Touch the ◀ or ▶ button to select the menu you want to work with.
- 3 Touch the **SCROLL** button to select the parameter. Touch the ◀ or ▶ button to set the parameter to the desired value. Touch the **MENU** button to save your changes and close the **OSD**. **Note:** Grayed out parameters are not accessible.



## Display Setup

### SDI Picture Menu

DSP1: SDI 1 - 1920x1080p@29.97Hz

Picture	Color	Setup
Horizontal Position	50	- [Slider] +
Vertical Position	50	- [Slider] +
Sharpness	0	- [Slider] +
Phase	50	- [Slider] +
Frequency	50	- [Slider] +
Overscan	0	1 2 3 4 5 6
Scaling	Fill	Aspect 1:1
SmartSync	Alternative Modes(1/1)	

### S-Video Picture Menu

DSP1: S-Video A - 720x480i@59.94Hz

Picture	Color	Setup
Horizontal Position	5	- [Slider] +
Vertical Position	5	- [Slider] +
Sharpness	0	- [Slider] +
Phase	50	- [Slider] +
Frequency	50	- [Slider] +
Overscan	0	1 2 3 4 5 6
Scaling	Fill	Aspect 1:1
SmartSync	Alternative Modes(1/1)	

### Composite Picture Menu

DSP1: Composite A - 720x480i@59.94Hz

Picture	Color	Setup
Horizontal Position	5	- [Slider] +
Vertical Position	5	- [Slider] +
Sharpness	0	- [Slider] +
Phase	50	- [Slider] +
Frequency	50	- [Slider] +
Overscan	0	1 2 3 4 5 6
Scaling	Fill	Aspect 1:1
SmartSync	Alternative Modes(1/1)	

#### Horizontal Position

Moves the image to the left or right. Touch ◀ or ▶ to horizontally center the image. **Note:** This parameter is not available for SDI inputs.

#### Vertical Position

Moves the image up or down. Touch ◀ or ▶ to vertically center the image. **Note:** This parameter is not available for SDI inputs.

#### Sharpness

Touch ◀ or ▶ to adjust the sharpness (focus) of the displayed image.

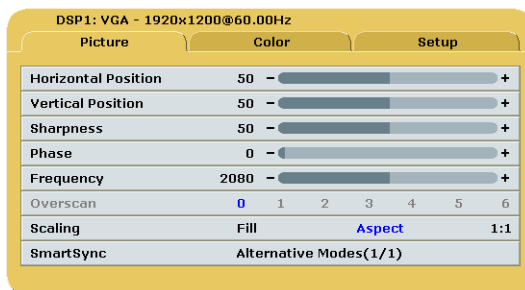
#### Overscan

**0** = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.

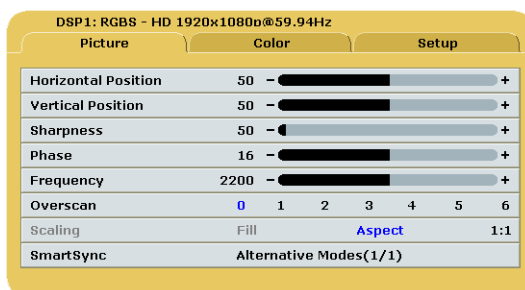
**1, 2, 3, 4, 5** or **6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◀ or ▶ buttons.



## VGA / SOG Picture Menu



## RGBS / YPbPr Picture Menu



### Horizontal Position

Moves the image to the left or right. Touch ◀ or ▶ to horizontally center the image.

### Vertical Position

Moves the image up or down. Touch ◀ or ▶ to vertically center the image.

### Sharpness

Touch ◀ or ▶ to adjust the sharpness (focus) of the displayed image. **Note:** When the VGA input is active Sharpness cannot be adjusted when the display is operating at native resolution.

### Phase

Touch ◀ or ▶ to adjust the phase of the display's pixel clock.

### Frequency

Adjusts the frequency of the display's pixel clock. With Scaling set to **Fill** adjust until image just fills the screen horizontally. Touch ◀ or ▶ to adjust the frequency of the display's pixel clock.

### Scaling (Graphics)

This parameter is enabled when the input is graphics (computer) data.

**Fill** = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed.

**Aspect** = Expands the video image, without changing its aspect ratio, until its largest dimension fills the screen. Black bars may be displayed on the top and bottom or the left and right of the image.

**1:1** = Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◀ or ▶ buttons.

### Overscan (Video)

This parameter is enabled when the input is video (camera) data.

**0** = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.

**1, 2, 3, 4, 5 or 6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◀ or ▶ buttons.

### SmartSync™ / Alternative Modes

On initialization NDS' proprietary SmartSync technology examines the incoming signal and automatically displays the video image in its proper format. To run SmartSync select the SmartSync / Alternative Modes parameter and touch the ◀ button.

To select an alternate mode (format) select the SmartSync / Alternative Modes parameter and touch the ▶ button. The mode increments each time the ▶ button is touched until the selected mode equals the maximum available, the next time ▶ touched the first mode is restored.



## DVI Picture Menu

DSP1: DVI 1 - HD 1920 x 1080@60Hz		
Picture	Color	Setup
Horizontal Position	50	- [Slider] +
Vertical Position	50	- [Slider] +
Sharpness	50	- [Slider] +
Phase	0	- [Slider] +
Frequency	2080	- [Slider] +
Overscan	0	1 2 3 4 5 6
Scaling	Fill	Aspect 1:1
SmartSync	Alternative Modes(1/1)	

## LAN Picture Menu

DSP1: LAN - 1920x1080i@60.00Hz		
Picture	Color	Setup
Horizontal Position	50	- [Slider] +
Vertical Position	50	- [Slider] +
Sharpness	0	- [Slider] +
Phase	50	- [Slider] +
Frequency	50	- [Slider] +
Overscan	0	1 2 3 4 5 6
Scaling	Fill	Aspect 1:1
SmartSync	Alternative Modes(1/1)	

### Overscan (Video)

This parameter is enabled when the input is video (camera) data.

**0** = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.

**1, 2, 3, 4, 5 or 6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◀ or ▶ buttons.

### Scaling (Graphics)

This parameter is enabled when the input is graphics (computer) data.

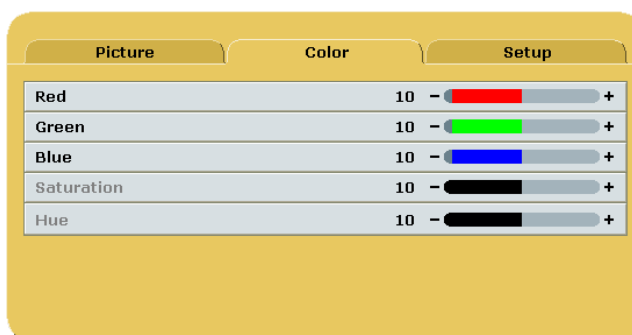
**Fill** = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed.

**Aspect** = Expands the video image, without changing its aspect ratio, until its largest dimension fills the screen. Black bars may be displayed on the top and bottom or the left and right of the image.

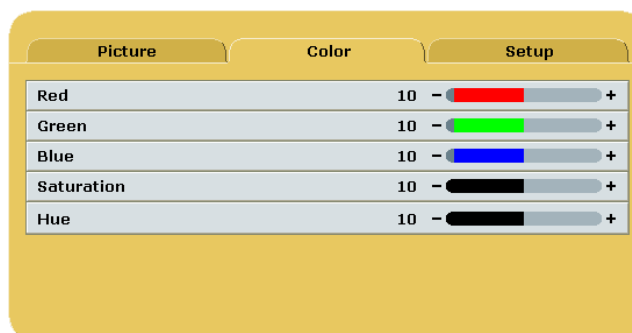
**1:1** = Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◀ or ▶ buttons.

## Color Menus

### Graphics Color Menu



### Video Color Menu



#### Red, Green, Blue (Video or Graphic modes)

Touch the ◀ or ▶ button to increase or decrease the intensity of the selected color.

#### Saturation (Video modes only)<sup>2</sup>

Touch ◀ or ▶ to set the saturation (color intensity) of the image.

#### Hue (Video modes only)<sup>2</sup>

Touch ◀ or ▶ to set the hue (color tint) of the image.

#### Notes:

1. A list of supported Graphic and Video modes is shown on page 62.
2. This product is capable of passing Radiology (PACS) images to a compatible display. These PACS images are for reference only and may not be used for diagnostic purposes.

## Setup Menu



### Menu Position

Places the menu in 1 of 9 predefined screen positions. Touch the ◀ or ▶ button to select any of the 9 screen positions. The default position is in the lower left corner.

### Language

The **ConductOR** currently supports English only.

### DPMS Enable

Display Power Management System. This function is not supported on the **ConductOR**.

### Auto Source Select

This function is not supported on the **ConductOR**.

### Menu Lock

The menu may be locked via an external control program.

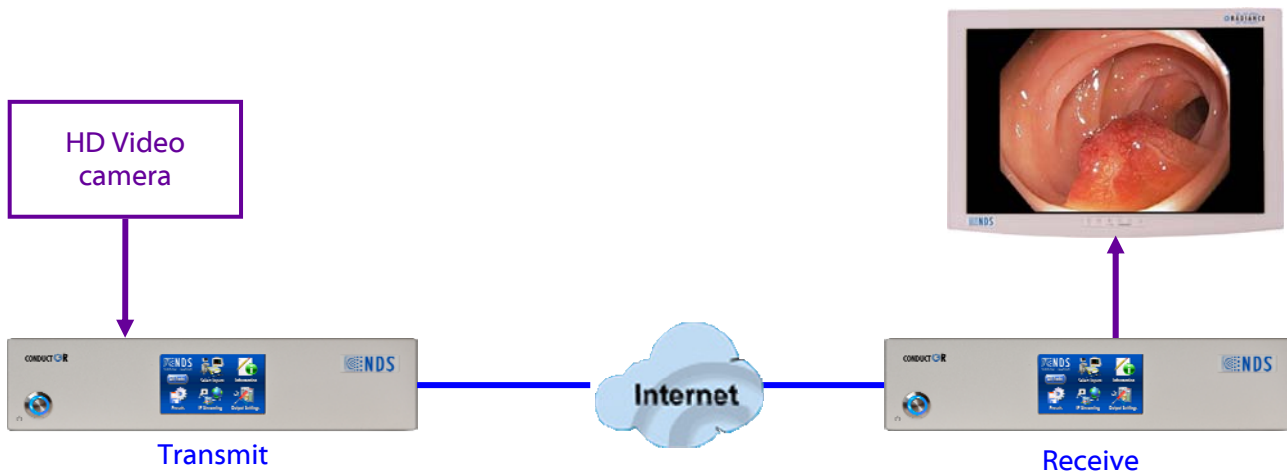
**Operating Hours:** This function is not supported on the **ConductOR**.

**BIOS:** Version of the **ConductOR**'s Scalar firmware.

## Streaming Video and Audio from Location to Location

### Overview:

If surgeons or other clinical staff members need to communicate with their colleagues at another location and each location has a **ConductOR** available, the **ConductORs** may be connected via your internal network or the Internet for the purpose of video and audio communication. Video is transmitted from the **ConductOR** designated as 'Transmit' and viewed on the **ConductOR** designated as 'Receive'. The audio is bidirectional, allowing the staff at each location to converse with each other.

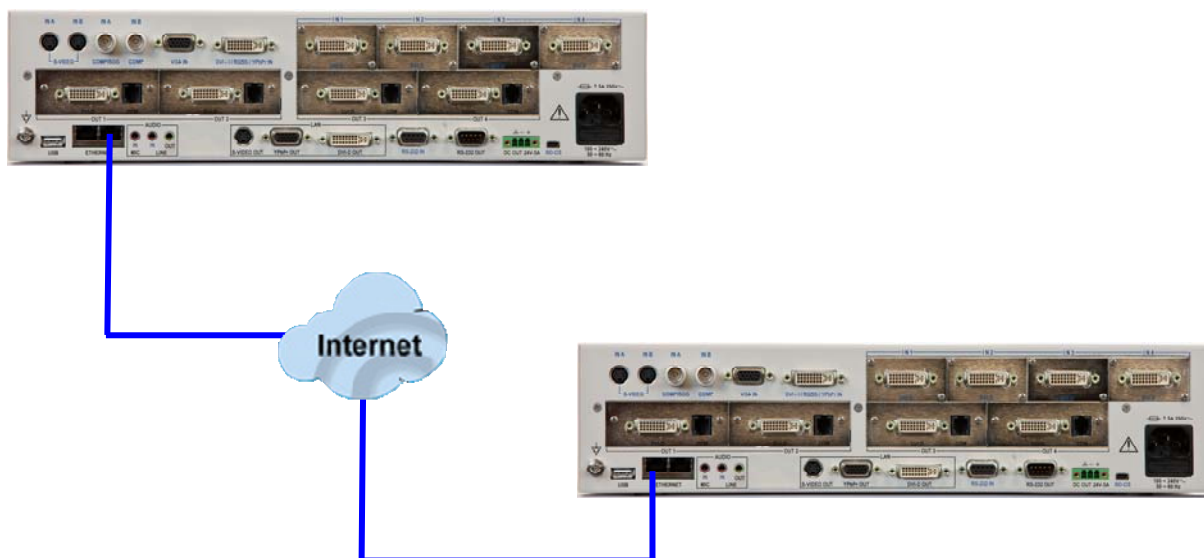


8

## Location to Location Network Connections

Connect the **ConductOR** units to your facility's internal network using Category 5 Ethernet cable. **Note:** For clarity only the Network connections are shown in the illustration below.

[Software Setup](#) is detailed on the following pages.



## Software Setup



Except as noted, IP addresses, and **ConductOR** input and output selections in the following instructions are for illustration.

When the **ConductOR** is connected to your IP network and powered on, the network will automatically assign it an IP address via its **Dynamic Host Configuration Protocol** (DHCP) feature\*.

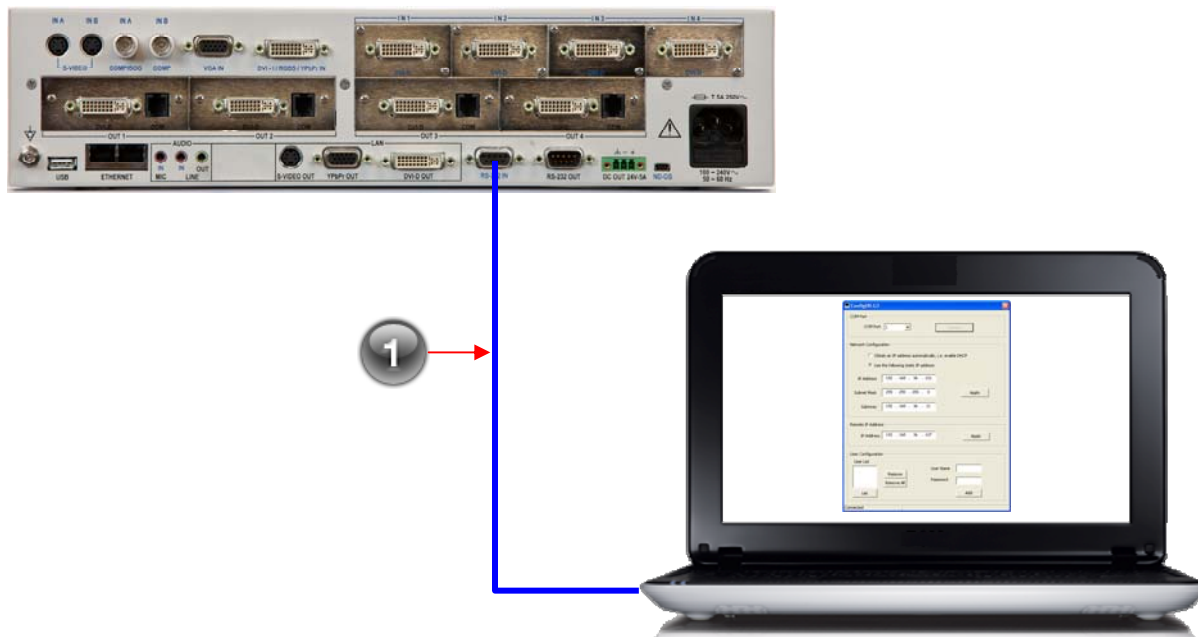


Connect an RS-232 cable from your PC to the **ConductOR**'s **RS-232 IN** connector.

Continued on the following pages



\* A DHCP assigned IP address may change if the **ConductOR** is disconnected from the network and reconnected or if it is turned off.



## Location to Location Streaming



**Note:** The following steps assume that you are continuing from the Software Setup section.

- 1 Touch the **IP Streaming** icon on the **Transmit** unit's **Home** screen (page 9). When the **IP Streaming** screen is displayed, select:
- 2 On the **Mode** row, select Transmit by touching the **Transmit** button.
- 3 On the **Stream Source** row select the **Display** (output) to be used as the streaming source.
- 4 On the **Stream Resolution** row, select the stream resolution **1080i**, **720p** or **480p**.
- 5 The IP address is displayed in the **IP Address** row window should be the same as the IP address that was assigned via [DHCP](#) (page 19), or [Manual IP Address Assignment](#) (page 20).
- 6 Touch the **IP Streaming** icon on the **Receive** unit's **Home** screen. When the **IP Streaming** screen is displayed, select **Receive** on the **Mode** row. **Stream Source** is disabled in receive mode. **Stream Resolution** will be automatically set to match the resolution of the inbound stream. **Note:** Switching between Transmit and Receive requires "rebooting" the **Conductor**.
- 7 The IP address is displayed in the **IP Address** row's window should be the same as the IP address that was assigned via [DHCP](#) (page 19), or [Manual IP Address Assignment](#) (page 20).

Continued on the following page.



- ① Touch the **Start** button.
- ② The legend on the button changes to **Stop**.
- ③ The “Connecting to....” screen is displayed.
- ④ When the “Connected” screen is displayed, streaming has started.

Continued on the next page.





The **Transmit** unit's IP Streaming and the **Receive** unit's screens while streaming is in progress are shown below.

- 1 The **Transmit** unit's **Remote IP** window holds the address of the **Receive** unit's IP address. The **Receive** unit's address changes to green when an connection is established.
- 2 The **Receive** unit's **Remote IP** window remains empty.
- 3 Touch the **Stop**\* button to stop streaming data to the **Receive** unit.

**Note:** If the **Transmit** unit's IP address appears in the **Receive** unit's **Remote IP** window, then streaming may be initiated or terminated from either unit. Setting a Remote IP address is described on page 21.

Streaming video and audio are described on the following pages.



**Note:** Always terminate streaming with the **Stop** button. Failure to do so may leave the **ConductOR** in a state that requires the power be turned off and on to clear.





**Note:** The following steps assume that you are continuing from the previous page.

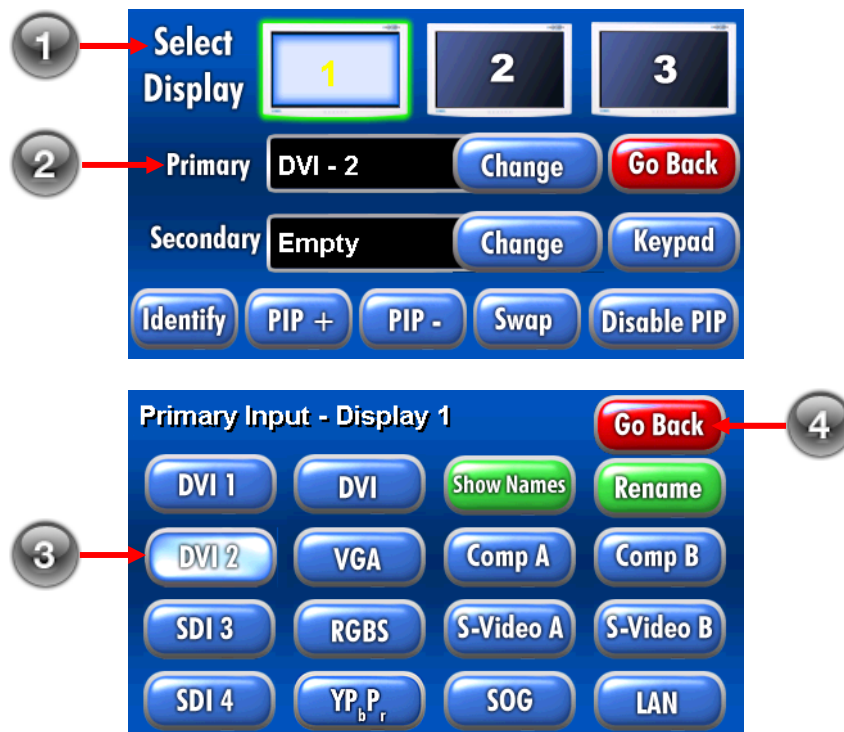
**Comment:** In the Transmit Unit Setup section, Display 1 and the DVI-2 input are used for illustration.

### Transmit Unit Setup:

Connect a **DVI** signal source to the **Transmit** unit's **DVI-2** connector. Connect the **Transmit** unit's **OUT 1** (Connector Panel is shown on page 3) to a compatible display. On the **Home** screen (page 9), touch the **Select Inputs** icon. Verify that the resolution of the selected output is **1080**. (See page 15)

- 1 On the **Select Display** row touch the **Display 1** icon.
- 2 On the **Primary** row touch the **Change** button.
- 3 The **Primary Input** screen is displayed. Touch the **DVI-2** button.
- 4 Finally, touch the **Go Back** button to return to the **Select Inputs** screen. Verify that **DVI-2** appears in the **Primary** row window. An image of the **DVI** signal should be shown on the connected display. This completes the **Transmit** unit setup.

**Receive Unit Setup** is described on the following page.





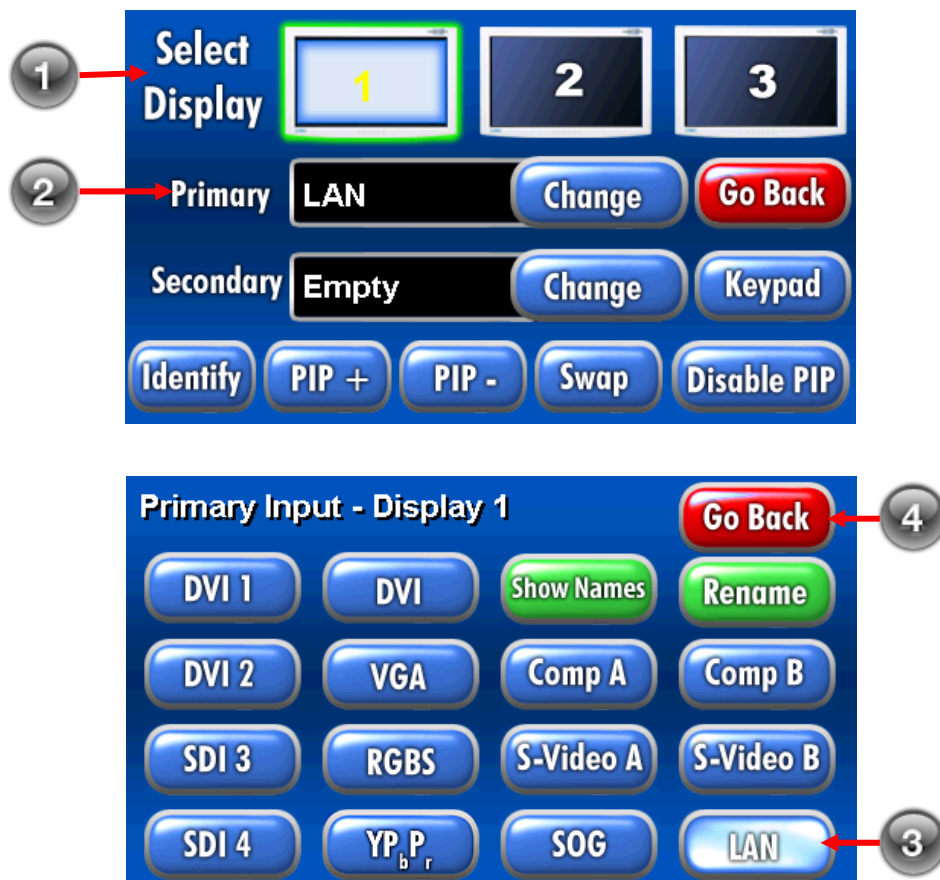
**Comment:** In the Receive Unit Setup section, Display 1 is used for illustration.

#### Receive Unit Setup:

Connect the **Receive** unit's **OUT 1** (Connector Panel is shown on page 3) to a compatible display. On the **Receive** unit's **Home** screen (page 9) touch the **Select Inputs** icon.

- 1 On the **Select Display** row touch the **Display 1** icon.
- 2 On the **Primary** row touch the **Change** button.
- 3 The **Primary Input** screen is displayed. Touch the **LAN** button. Finally, touch the **Go Back** button to return to the **Select Inputs** screen.
- 4 Verify that **LAN** appears in the **Primary** row window. An image of the **DVI** signal applied to the **Transmit** unit's **DVI-2** input (page 37) should appear on the display connected to the **Receive** unit's **OUT 1**.

**Streaming Audio** is described on the following page.



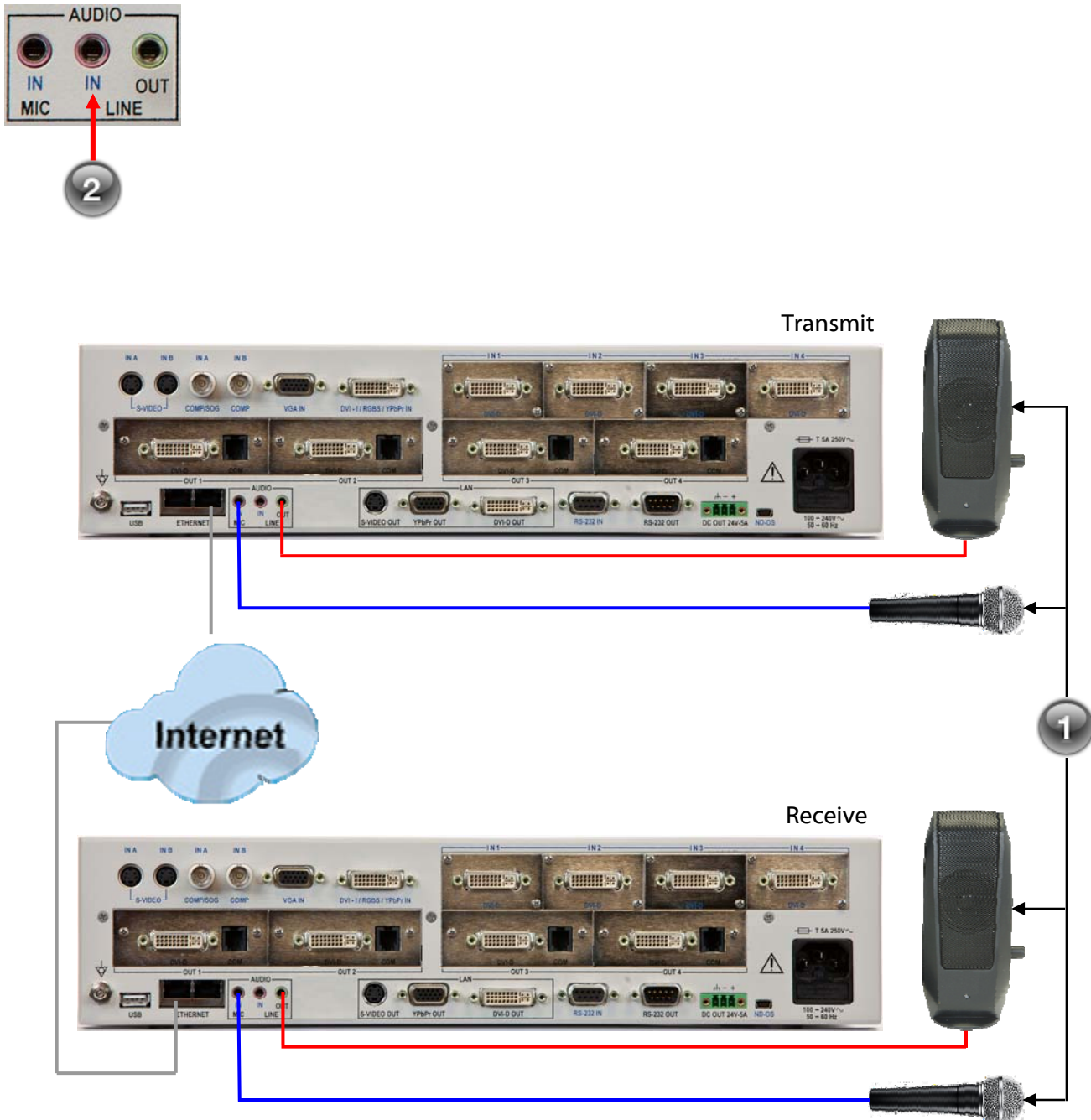
## Streaming Audio

Use the setup described in the [Streaming Video](#) section (page 37).

- 1 Connect a microphone (blue line) to the **AUDIO IN MIC** connector of both units and a powered speaker (red line) to the **AUDIO OUT** connector of both units. Speak into the microphone connected to the **Transmit** unit and you should hear your voice on the powered speaker connected to the **Receive** unit. Now speak into the microphone connected to the **Receive** unit and you should hear your voice on the speaker connected to the **Transmit** unit.

**Note:** For audio clarity, NDS recommends that echo cancelling hardware be used

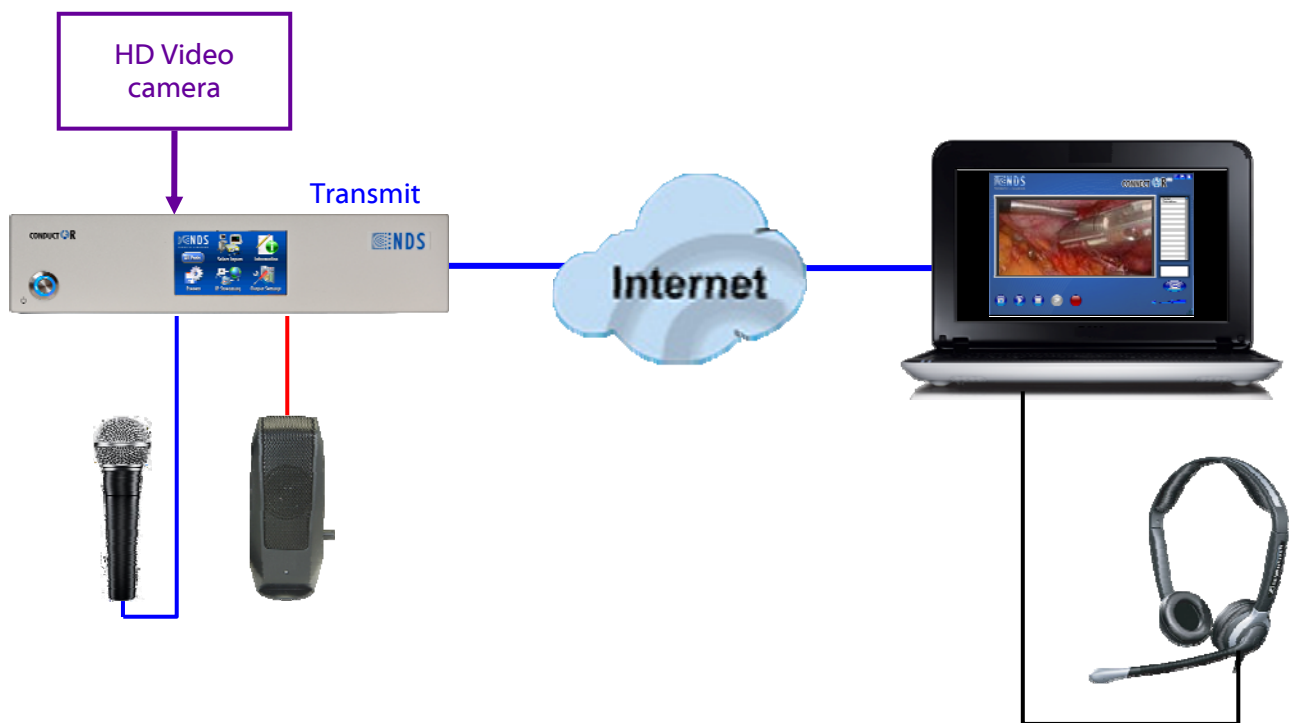
- 2 **AUDIO IN** is not used.



## Streaming from ConductOR to a PC

### Overview:

During a surgical procedure the surgeon performing the procedure may need to communicate with one or more colleagues at other locations. If the colleagues have a [PC](#), [Internet connection](#) and **ViewOR** available, they will be able to observe the procedure in real time and communicate as needed.



## ViewOR G2 Setup and Usage

### Preparing the ConductOR:

Connect the **ConductOR** (unit) to your network then connect the network to your PC using Ethernet cables. Turn the PC and the unit on. Connect a compatible signal source to the unit's **DVI 2** input. Connect the unit's **OUT 1** (see connector panel on page 3) to a compatible display. Finally, on the **Home** screen (page 9), touch **Select Inputs** icon.

- 1 On the **Select Display** row touch the **Display 1** icon.
- 2 Touch the **Change** button on the **Primary** row.
- 3 The **Primary Input** screen is displayed. Touch the **DVI 2** button. An image of the signal applied to **DVI 2** should be shown on the connected display.

Continued on the following page.



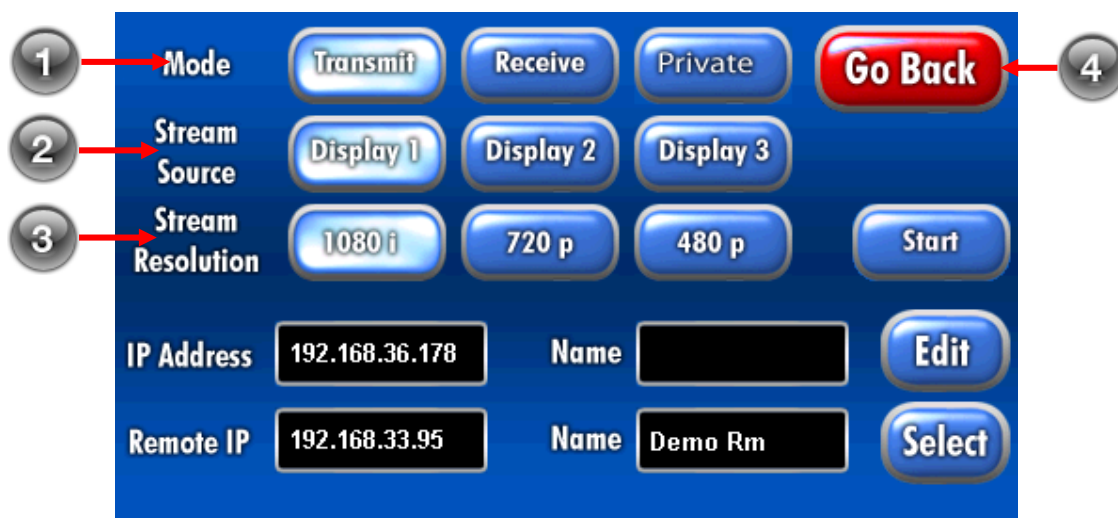


Settings in the following procedure are for illustration.

Touch the **IP Streaming** icon on the **Home** screen (page 9) to access the **IP Streaming** screen.


- ① On the **Mode** row, touch the **Transmit** button.
- ② Select **Display 1** on the **Stream Source** row.
- ③ Select **720p** on the **Stream Resolution** row.
- ④ Touch the **Go Back** button to return to the **Home** page.

Continued on the following page.





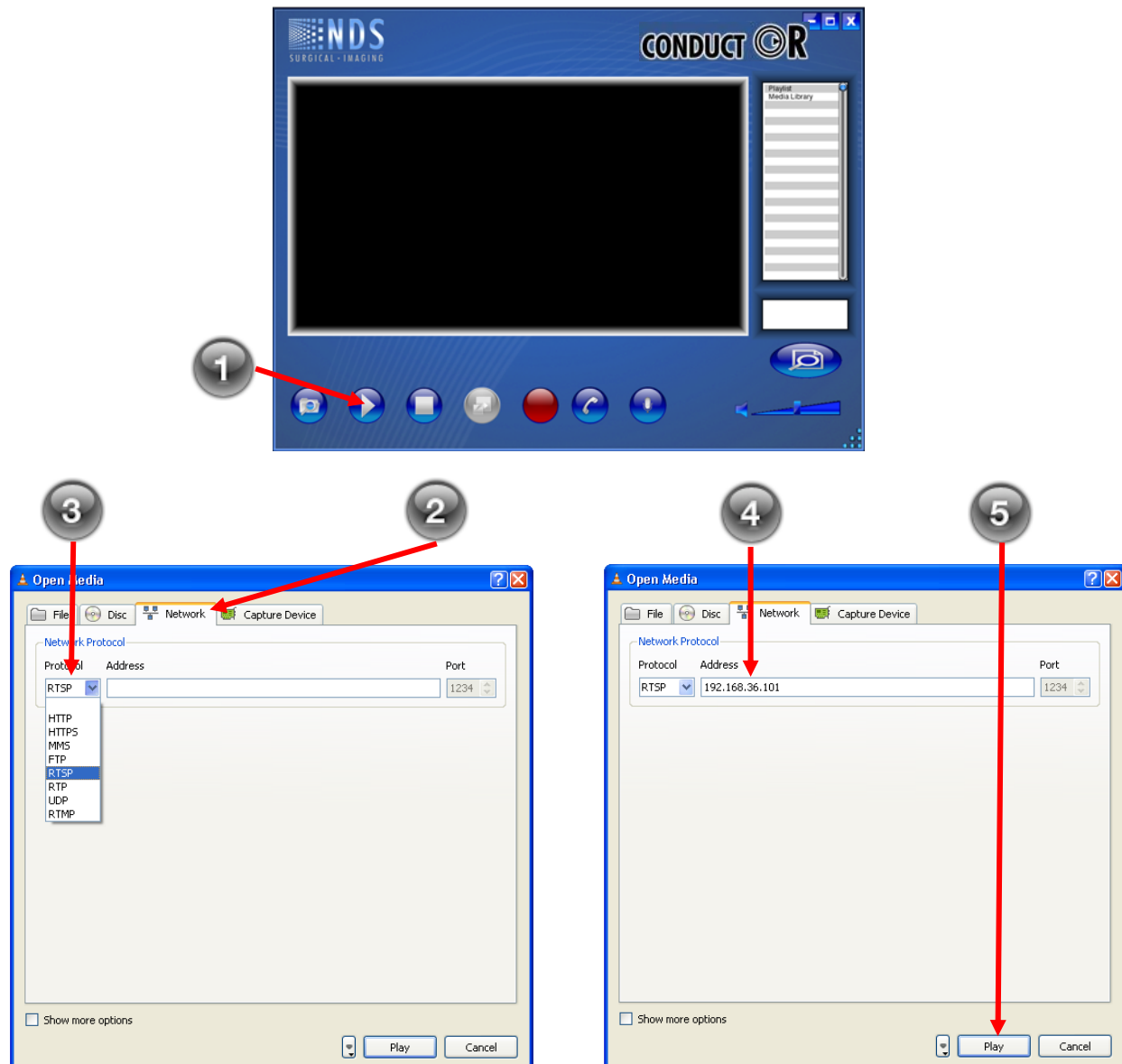
## Using the ViewOR Program

 The **ViewOR** program is a live streaming viewer supplied for use with the **Conductor**, and is meant as a reference only for observational and educational purposes. **ViewOR** is not intended for diagnostic use.

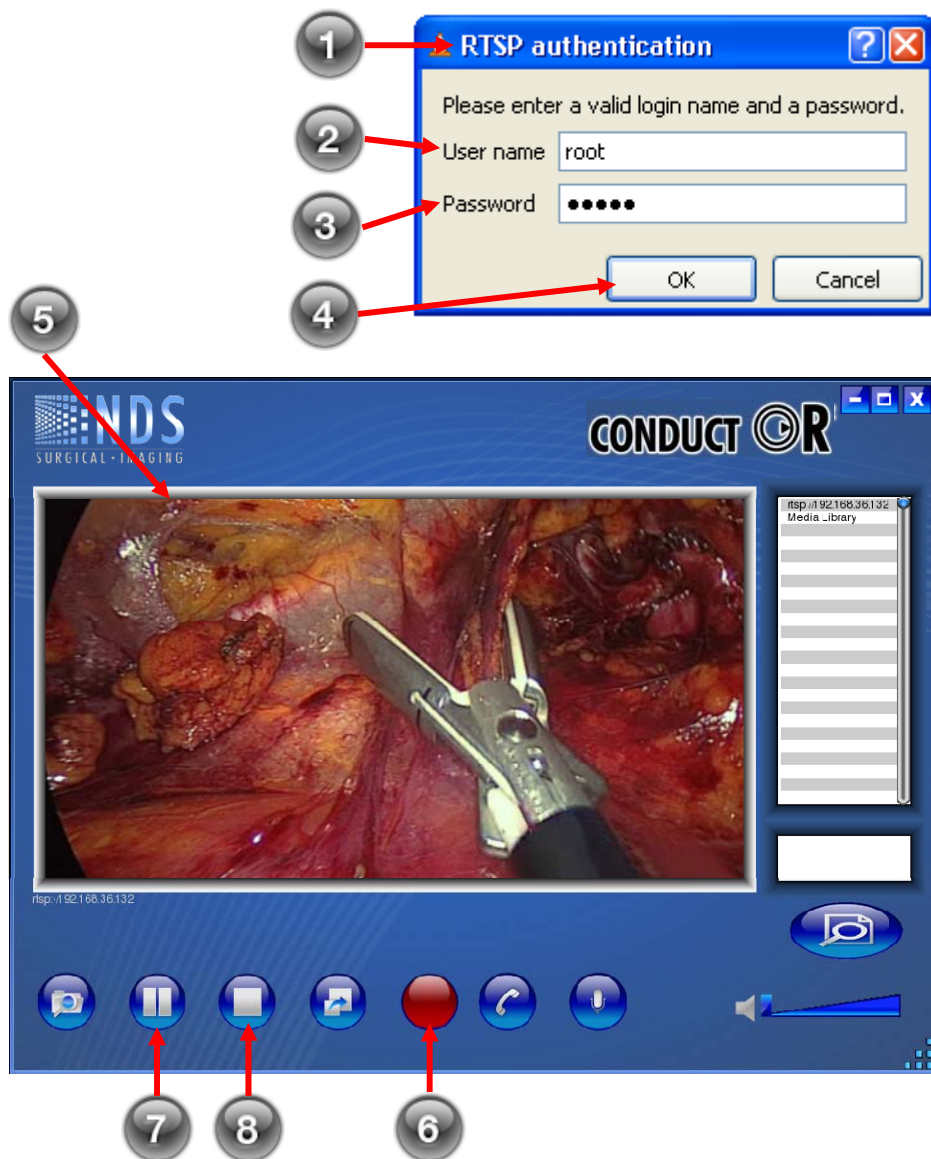
The **ViewOR** program must be run on a PC, it is not currently compatible with Apple™ computers. Double click the **ViewOR** icon to launch the program.

- 1 Click the ► button, the **Open Media** window is displayed.
- 2 Click the **Open Media** window's **Network** tab.
- 3 Select **RTSP** from the **Protocol** pull down menu.
- 4 Type the IP address obtained or entered in the previous section into the **Address** window.
- 5 Click the **Open Media** window's **Play** button.

Continued on the following page.

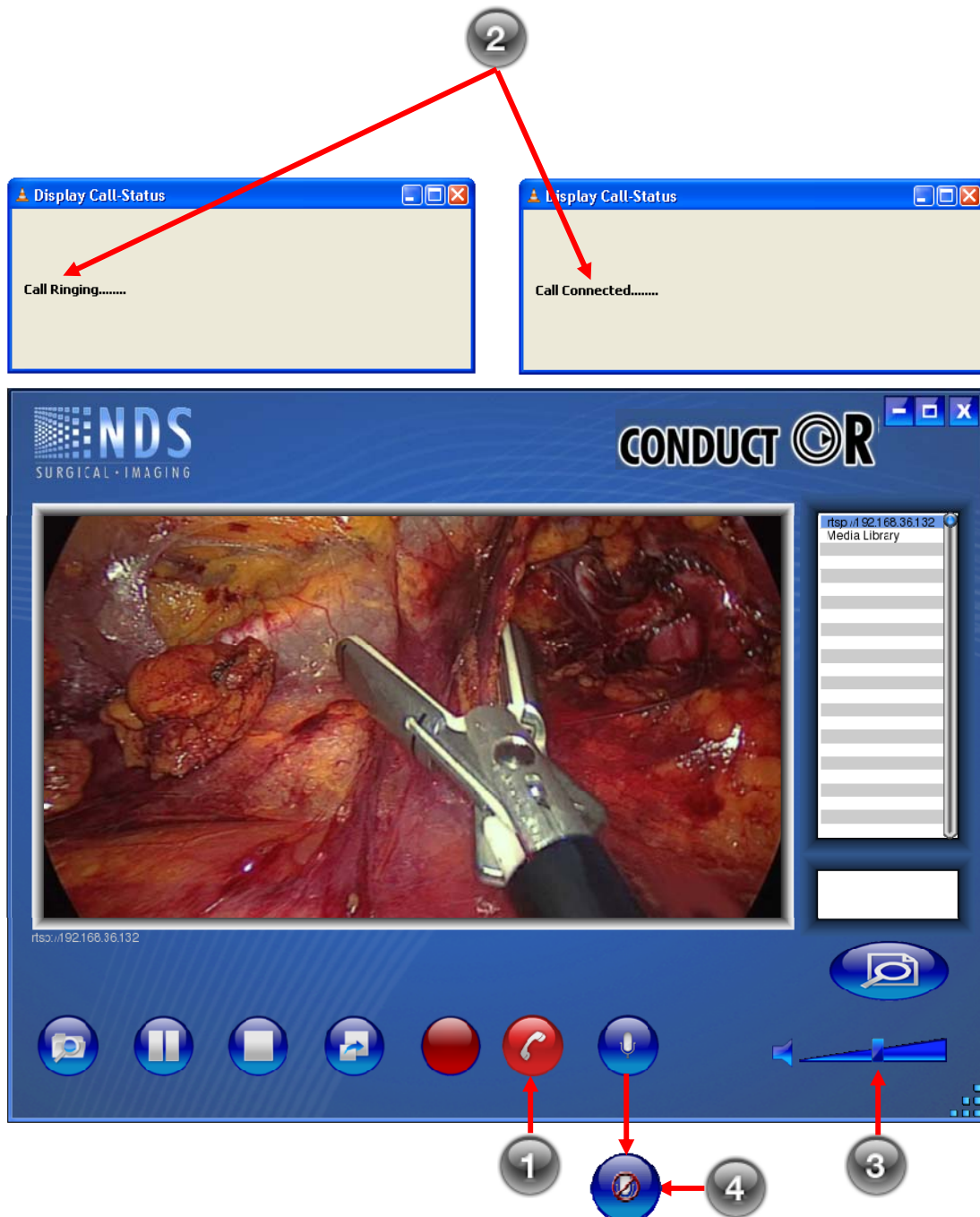


- 1 The **RTSP authentication** window is displayed.
- 2 In the **User name** window, type: **root** (all lower case).
- 3 In the **Password** window, type: **admin** (all lower case).
- 4 Click the **OK** button.
- 5 A copy of the image on **display 1** is displayed in the **ViewOR G2** viewing area. **Note:** It takes up to 15 seconds before an image is displayed.
- 6 Record the video by clicking the record button, the record button starts flashing. Recording stops when the record button is clicked again. File name structure: **vlc-record-2011-03-08-09h28m56s-rtsp\_\_192.168.36.208-**  
Header: **vlc-record-**  
Time Code: **2011-03-08-09h28m56s-**  
Protocol: **rtsp** IP Address: **192.168.36.208**
- 7 Click the **II** button to pause the streaming video.
- 8 Click the **■** button to stop the streaming video.




- ① Click the **Telephone Handset** button to open a two way audio path.
- ② The button turns red and a **Call Ringing** message appears. **Call Connected** appears when the audio connection is established.\*
- ③ Place the cursor over the Volume slider, hold the left mouse button down and move the slider to set the volume to the desired level.
- ④ The PC's microphone may be muted by clicking the **Microphone** button. A red ring with a line through it is placed over the microphone icon.

⚠ \*Always terminate an audio session by pressing the **Telephone Handset** button.



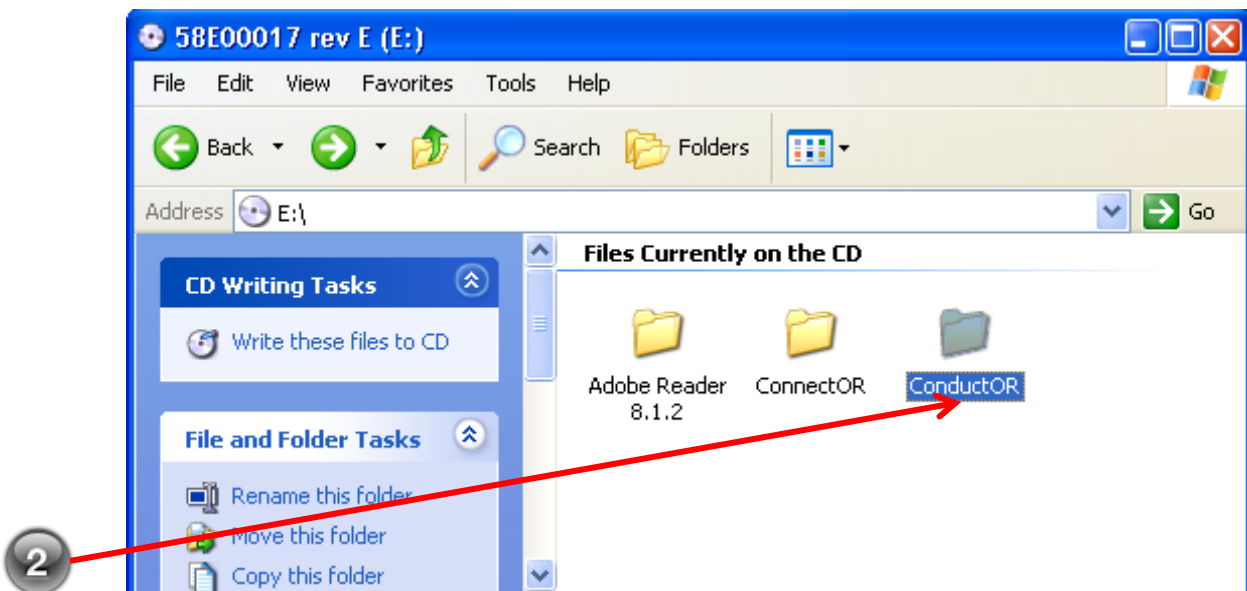
### Installing the utility software:

 The programs contained on the CD (P/N 58E0017) are for familiarization, testing, training, installation and troubleshooting. They may not be used during clinical procedures.

Place the supplied Integration Software and Users Manual CD (58E0017) in your PC's CD or DVD drive and double click the My Computer icon.

- 1 Double click the 58E0017 icon.
- 2 Double click the ConductOR folder.

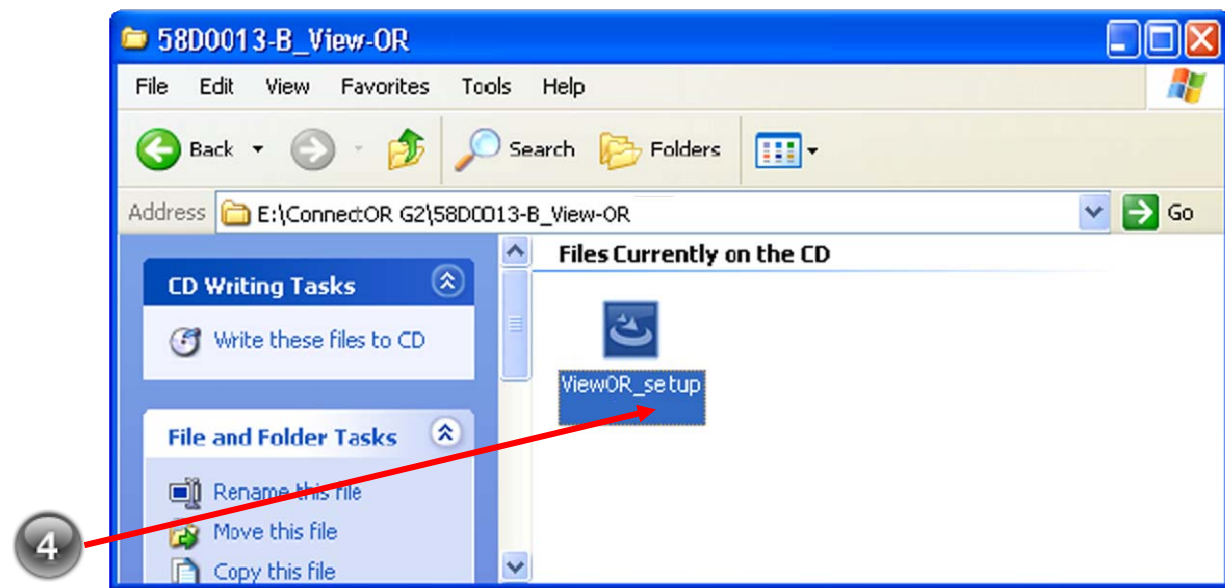
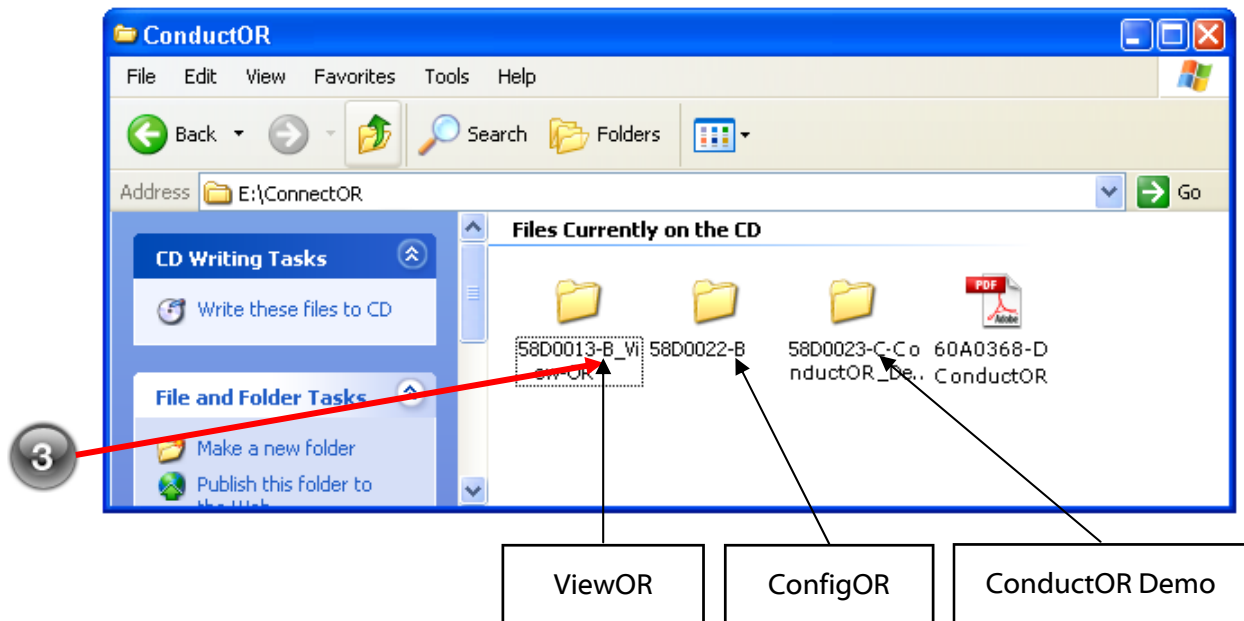
Continued on the following page.



3 Select the software to be installed and double click its folder.

4 Double click the Setup icon. Follow the on screen instructions.

Repeat steps 3 and 4 for each additional software package you want to install.



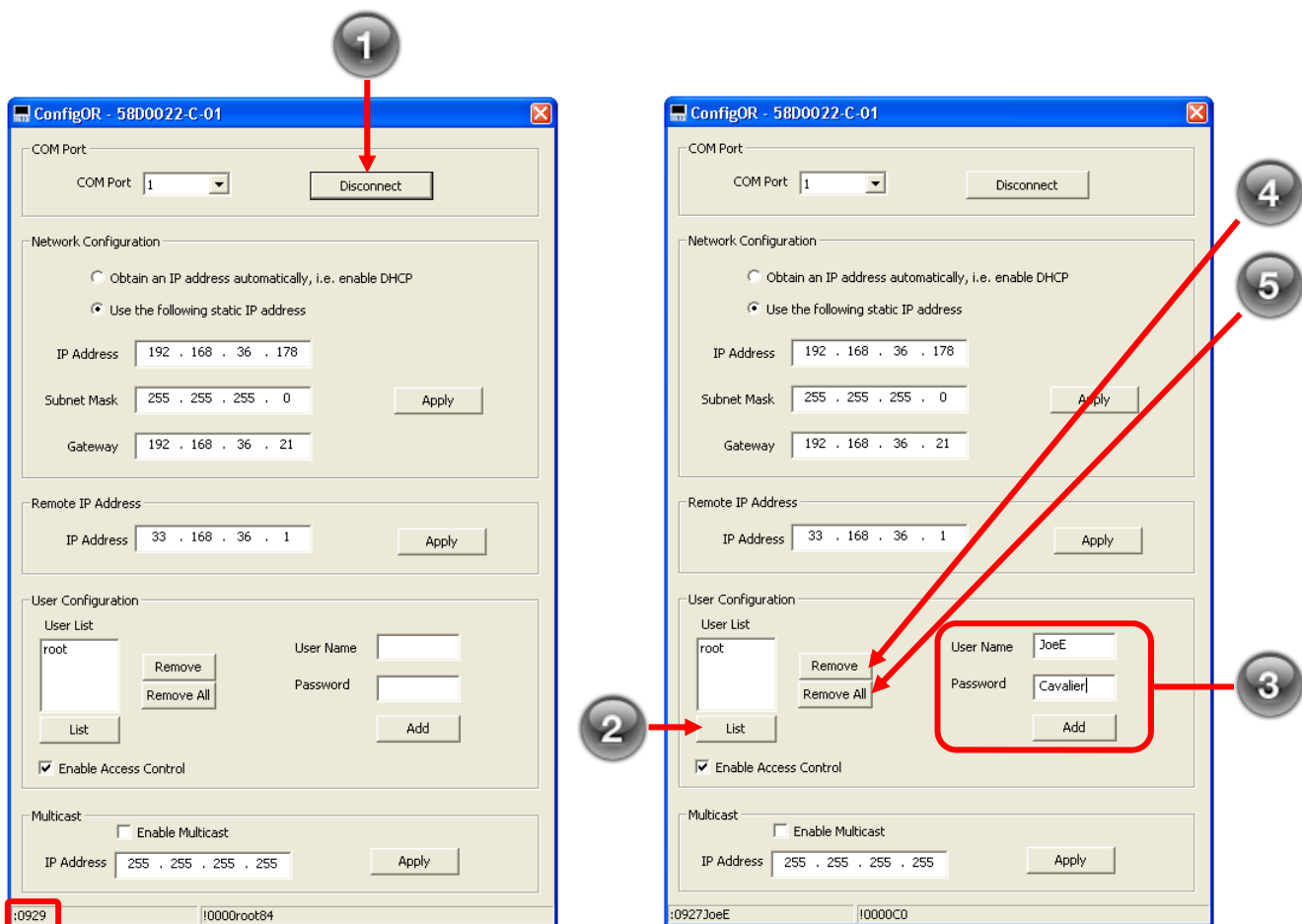
## User Configuration

Connect your PC to the **ConductOR** via an RS-232 cable. Verify that both are powered on.

- 1 Launch the **ConfigOR** program, click the **Connect** button and verify that the legend on the **Connect** button changes to **Disconnect** and that :0929 appears in the lower left corner.
- 2 In the **User Configuration** section click the **List** button. If less than four names appear you may add additional names and passwords. If four names appear, then one or more of the names must be removed before any names can be added.
- 3 Type the new **user name** in the **User Name** window and its password in the **Password** window. Finally, click the **Add** button to save the name and password.
- 4 A single **user name** may be removed by selecting the name in the **User List** then clicking the **Remove** button.
- 5 All **user names** may be removed by clicking the **Remove All** button.

Click the **Disconnect** button, close the **ConfigOR** program, then turn the **ConductOR** off and on. This writes the names and passwords into the **ConductOR**'s memory. The names and passwords are used with the **ViewOR** program.

**Note: User Configuration** data overwrites the default user name (**root**) and password (**admin**). If all user names are deleted, the default user name (**root**) and password (**admin**) are restored when the **ConductOR** is turned off and on.





## Demonstrator Program



The **ConductOR Demonstration** program (NDS 58D0023) is intended for demonstration, familiarization, installation and testing of the **ConductOR**. It may not be used in an OR while any clinical procedure is in progress.

### Setup:

1. Connect a straight through serial cable (NDS 35D0003 or equivalent) from the PC's serial port to the **RS-232 IN** connector.
2. Connect one or more signal sources to the appropriate **ConductOR** inputs.
3. Connect one of the **ConductOR**'s outputs to a compatible monitor. Compatible monitors are listed the [General Information](#) section on page 2.
4. The **ConductOR** and the PC should be turned on.

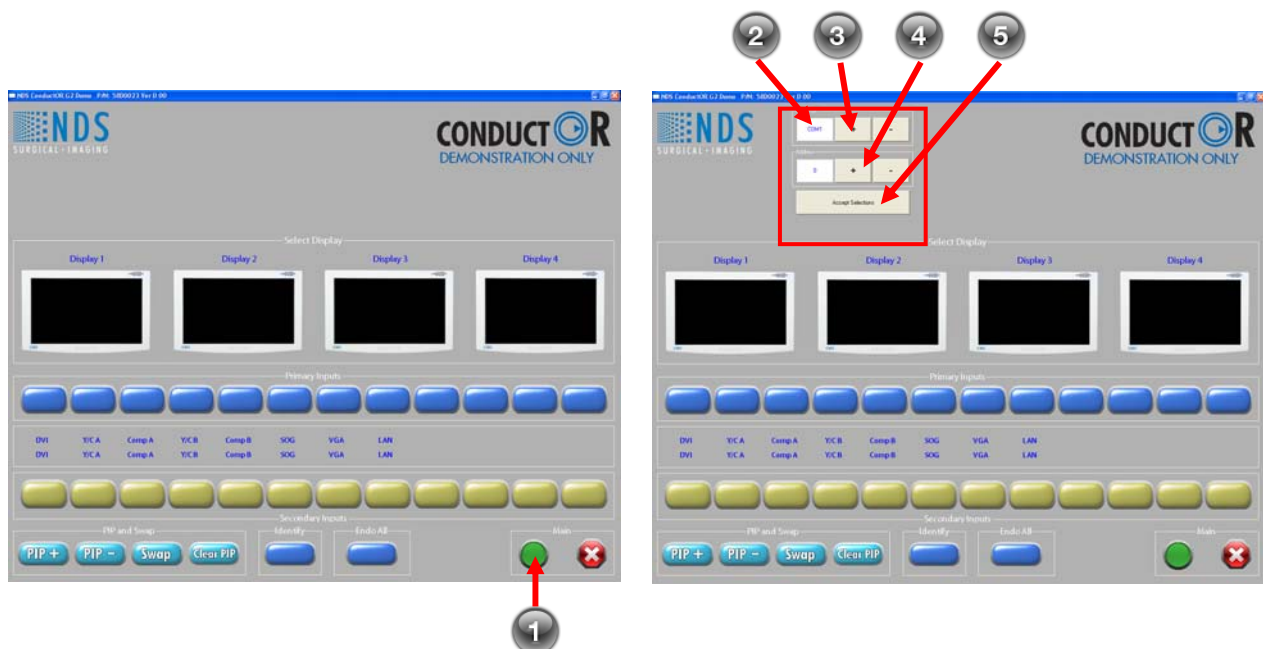
### Usage:

The demonstration program is designed to run on a 1280 x 1024 or larger monitor.

Click the Windows Start button, then click All Programs. Select: NDS Surgical Imaging, then select and click **ConductOR Demo** to launch the demonstration program. The program's startup screen is shown below. The four right hand primary / secondary input labels will be blank until the program is communicating with the **ConductOR**.

- 1 Click the green button in the lower right corner to start communications with the **ConductOR**.
- 2 The **Com Port** and **Address** selection windows are displayed.
- 3 Select the **Com Port** using the + or - buttons to the right of the **Com Port** window.
- 4 If the address isn't 0, then set it to 0 using the + or - buttons to the right of the **Address** window.
- 5 After selecting the **Com Port** and Address click the **Accept Selections** button.

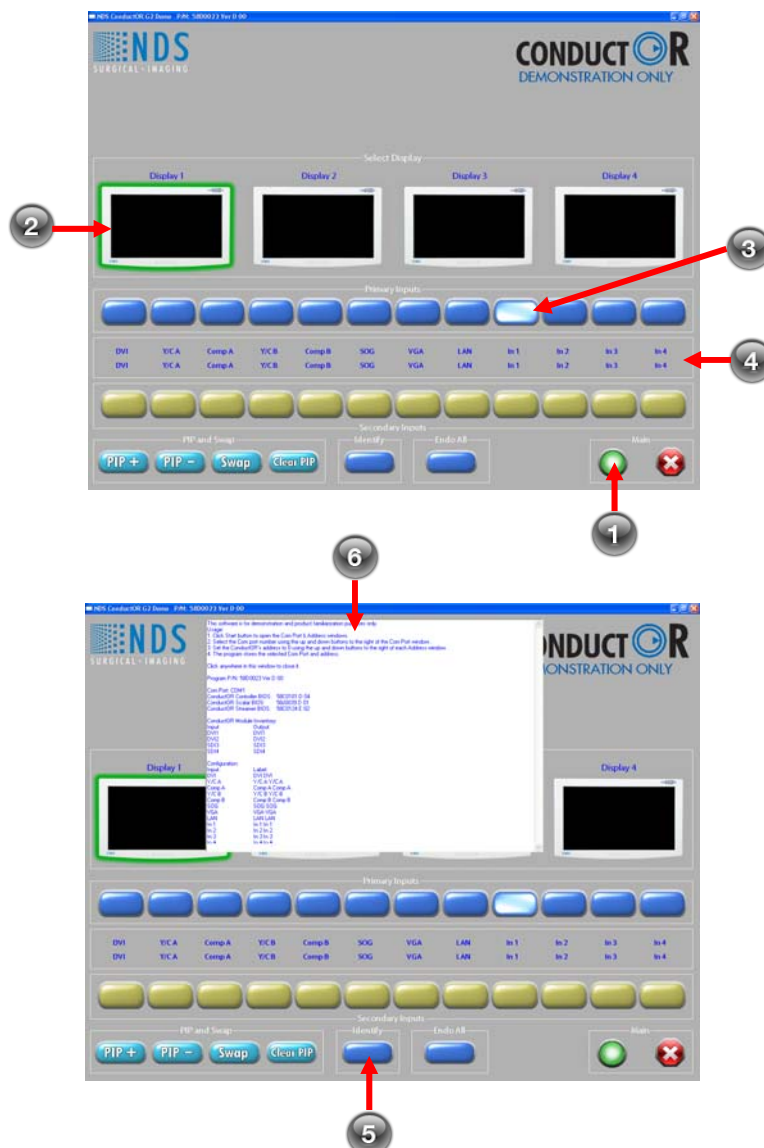
Continued on the following page.





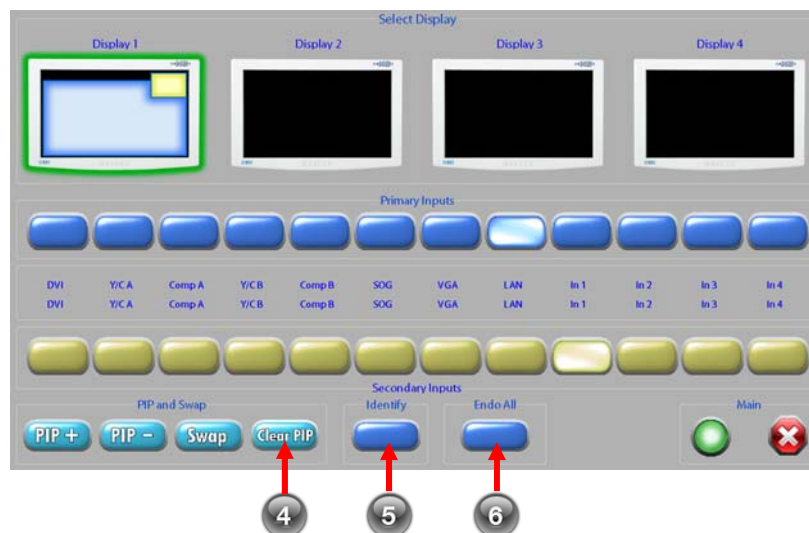
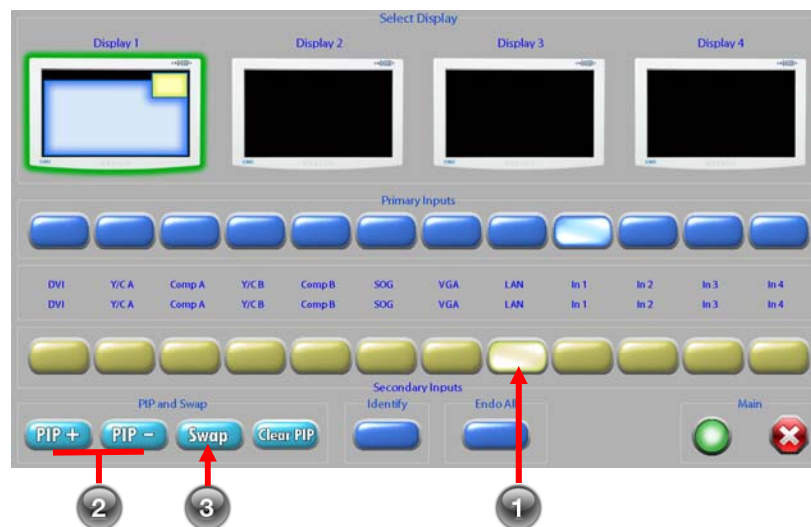
- ① When the program is communicating with the **ConductOR**, the green button will be illuminated.
- ② **Display 1** will be the active display and surrounded in green.
- ③ One of the primary input buttons will be illuminated.
- ④ A label will be added each of the four right primary and secondary inputs that has a corresponding input module installed.
- ⑤ Clicking the **Identify** button displays a **1, 2 or 3** in yellow on each of the monitors connected to the **ConductOR**. The monitor connected to **OUT 4** will display a **3**.
- ⑥ The program's **Help** file may be viewed by clicking the **NDS** logo. The **Help** file contains a **Usage** section, **Controller**, **Scalar** and **Streamer** BIOS part numbers, an inventory of the installed input and output modules, and the input configuration. The configuration shows the input type on the left and the legend assigned to it on the right. How to edit the configuration file will be discussed on page 52  
**Note:** The **Streamer** BIOS is not displayed until the **Streamer** has completed its initialization, this may take up to 30 seconds.

Continued on the following page.



Select **OUT 1, 2 or 3** by clicking the **Display 1, Display 2** or **Display 3** icon. The selected display icon will be surrounded in green. **Note:** **Display 4** and **Out 4** are selected when **Display 3** is selected.

- ① A secondary input may be selected by clicking one of the **Secondary Inputs** buttons. A graphic showing the size of the secondary (PIP) window will appear on the active display.
  - ② The size of the PIP window is controlled by the **PIP +** and **PIP -** buttons.
  - ③ The **Swap** button exchanges the **Primary** and **Secondary** windows.
  - ④ The **Clear PIP** button turns the PIP window off and clears the secondary input.
  - ⑤ Clicking the **Identify** button displays a 1, 2 or 3 on each connected monitor. The number corresponds to the output port to which the monitor is connected. A 3 will be displayed the monitors connected to output ports 3 and 4. A number will appear above monitor icons 1 and 2, and "\_\_\_3\_&\_4\_\_\_" will appear above monitor icons 3 and 4.
  - ⑥ Clicking the **Endo All** button will route the signal connected to the first installed input module to all output ports.
- ✖ Click this button to exit the program.



## Demonstration Configuration File

When [ConductOR Demo](#) program is launched, it looks for the [ConductOR Config](#) file. If found the program loads the file and configures itself to match the information in the file. If the [ConductOR Config](#) file is not found the program creates it. The [ConductOR Config](#) file may be edited to meet your requirements.

### ConductOR Config File Structure:

1 Image 1 shows the program running with the default (program generated) configuration:

```
"0,DVI,Y/C A,Comp A,Y/C B,Comp B,SOG,VGA,LAN,In 1,In 2,In 3,In 4"  
"|,DVI,Y/C A,Comp A,Y/C B,Comp B,SOG,VGA,LAN,In 1,In 2,In 3,In 4"  
"@,DVI,Y/C A,Comp A,Y/C B,Comp B,SOG,VGA,LAN,In 1,In 2,In 3,In 4"  
"Display 1, Display 2, Display 3, Display 4"
```

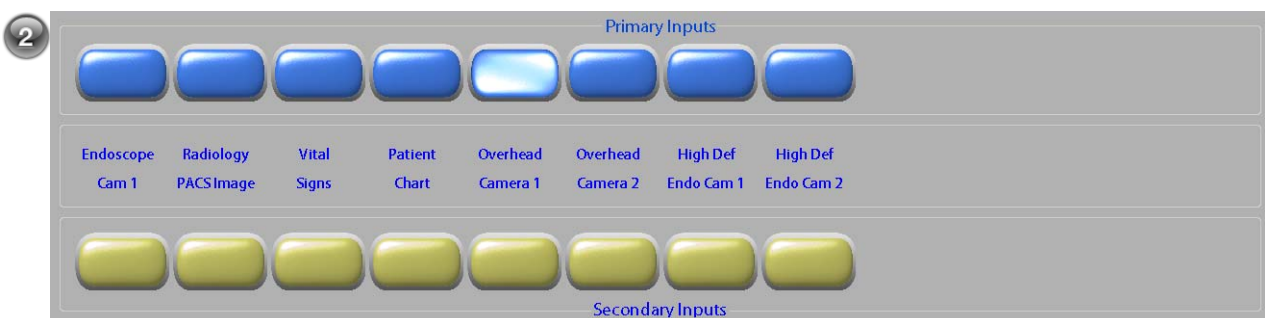
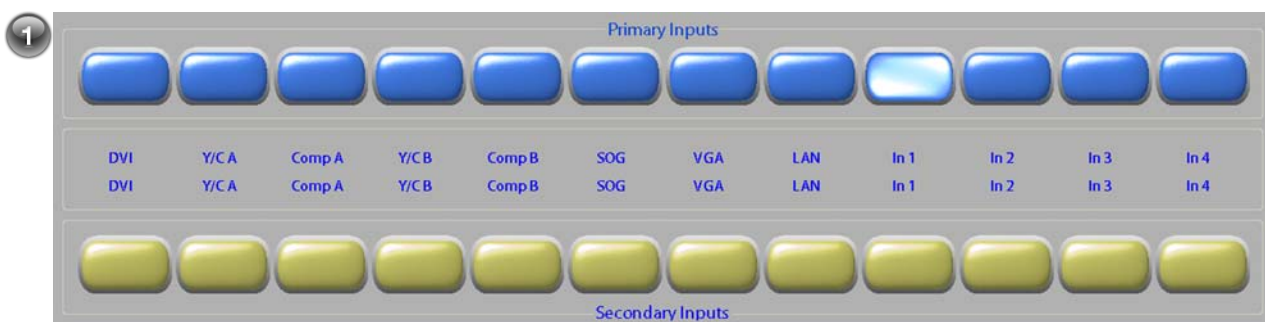
The first two lines of the configuration are the input button legend that appears between the Primary and Secondary rows of input buttons. The line that begins with “@”, is the signal type assigned to each input button. The [DVI](#) entry applies to the [DVI/RGBS/YPbPr](#) connector. When the entry is [DVI](#) the **ConductOR** expects a DVI signal. Change this entry to [RGBS](#) if you want to apply an RGBS signal, likewise change it to [YPbPr](#) if a YPbPr signal will be applied. The [In 1, In 2, In 3, In 4](#) entries apply to input modules 1 through 4. The specific signal type expected by each input module may be determined by reading the “[ConductOR Module Inventory](#)” in the program’s [Help](#) file, see page 50. The last line in the [ConductOR Config](#) file, [Display 1, Display 2, Display 3, Display 4](#) is the list of names applied to the [ConductOR](#)’s output ports. The output ports are represented by monitor icons, which are shown on the previous page.

2 Editing the ConductOR Config File:

Image 2 shows the program running with the following configuration:


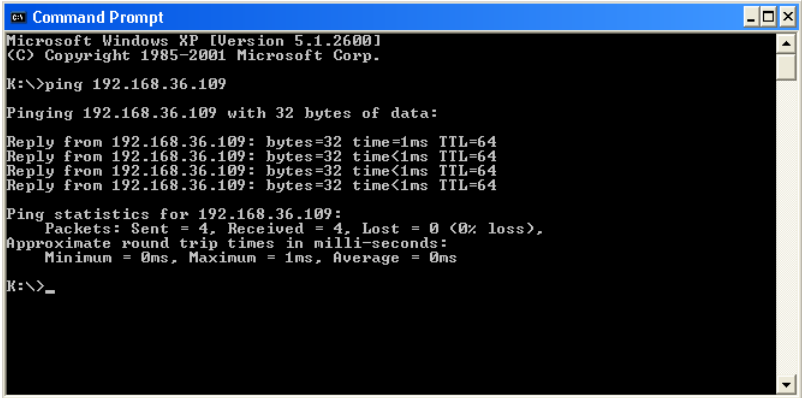
```
"0,Endoscope,Radiology,Vital,Patient,Overhead,Overhead,High Def,High Def"  
"|,Cam 1,PACS Image,Signs,Chart,Camera 1,Camera 2,Endo Cam 1,Endo Cam 2"  
"@,RGBS,SOG,VGA,LAN,In 1,In 2,In 3,In 4"  
"Boom Arm 1, Boom Arm 2, North Wall , West Wall"
```

The [Y/C A,Comp A,Y/C B,Comp B](#) entries have been removed and the [DVI](#) entry has been changed to [RGBS](#), in addition “[Display 1, Display 2, Display 3, Display 4](#)” have been replaced by “[Boom Arm 1, Boom Arm 2, North Wall , West Wall](#)”. To remove an input button simply delete the associated labels and their following commas (,) on the first two lines, then on the line that begins with “@”, the button and its following comma (,). The [DVI](#) entry is a special case, [DVI](#) and its following comma (,) may be deleted if the [DVI/RGBS/YPbPr](#) input will not be used or it may be changed to [RGBS](#) or [YPbPr](#).



## Troubleshooting and Test Section

Problem	Possible Causes and Remedies
Power switch does not illuminate in the <b>ON</b> state	<p>Loose Power Cable: Verify that the power cable is fully inserted into the unit's power connector.</p> <p>Failed Fuse: See <a href="#">Fuse Replacement</a> procedure on page 60.</p> <p>Wall Socket: Some wall sockets have on / off switches built in. If the socket you are using has a built in switch, verify that is in the on position.</p>
Input Module ID is not shown the <a href="#">Primary Input</a> screen	<p>Input Module is not installed: See <a href="#">Module Removal and Installation</a> procedure on page 6.</p> <p>Input Module is not fully seated in the socket: See <a href="#">Module Removal and Installation</a> procedure on page 6.</p> <p>Input Module has failed: Replace the Input Module using the <a href="#">Module Removal and Installation</a> procedure on page 6.</p>
Output Module ID is not shown on the <a href="#">Display Output Settings</a> screen	<p>Output Module is not installed: See <a href="#">Module Removal and Installation</a> procedure on page 6.</p> <p>Output Module is not fully seated in the socket: See <a href="#">Module Removal and Installation</a> procedure on page 6.</p> <p>Output Module has failed: Replace the Input Module using the <a href="#">Module Removal and Installation</a> procedure on page 6.</p>
Video is not displayed from a given Output Module	<p>Output Module does not have an input routed to it or the input does not have a signal connected to it: Touch the <b>Select Inputs</b> icon (page 9), then on the <b>Select Inputs</b> screen touch the <b>Identify</b> button. If the module's ID is displayed on one of the connected displays, then select an input that is known to a signal connected to it.</p> <p>Output Module is not connected or is connected to the wrong display: Touch the <b>Select Inputs</b> icon, then touch the <b>Identify</b> button. If the module's ID is not displayed on one of the connected displays, then replace the cable associated with the Output Module you are testing.</p>
Video is not displayed when a given Input Module is selected	<p>Connect the input signal to a different Input Module. If video appears, then the original Input Module may not be installed correctly or it has failed. If video does not appear, then the video source may be turned off or the connecting cable is disconnected or bad. If the signal source is turned on, try replacing the cable. Try reseating or replacing (page6) the input module.</p>
Video is not displayed when a given fixed input is selected	<p>Signal cable is disconnected, not properly connected or bad. Verify that the cable is connected correctly or replace the cable.</p>
Loss of image on remote viewer program	<p>If the viewer was previously displaying an image, then either the network has been disconnected or was interrupted for more than 5 seconds.</p> <p>Network interruptions of more than 5 seconds cause the viewer software to time out. The viewer software will then need to be re-initialized to restore the connection.</p>

Problem	Test
No video output	<p>Output Module confidence test:</p> <ol style="list-style-type: none"> <li>1. Turn the <b>ConductOR</b> off.</li> <li>2. Connect a display to each Output Module.</li> <li>3. Verify that each display is turned on and that its input type matches the output type of the output module to which it is connected.</li> <li>4. Turn the <b>ConductOR</b> on.</li> <li>5. In approximately 20 seconds, the <b>Startup Screen</b> (see page 8) should appear on each of the connected displays. If the <b>Startup Screen</b> appears on all displays, then the Output Modules are good.</li> </ol> <p>Touch the <b>Select Inputs</b> icon, then touch the <b>Identify</b> button. A <b>1</b> will appear on the display connected to output 1, <b>2</b> will appear on the display connected to output 2 and <b>3</b> will appear on the displays connected to outputs 3 and 4.</p>
Streamed data is not received	<ol style="list-style-type: none"> <li>1. On the <b>IP Streaming</b> screen verify that the <b>Mode</b> is <b>Receive</b>. If the 'Streaming subsystem is initializing' message appears and does not clear in 30 seconds, turn the <b>ConductOR</b>'s power off and on.</li> <li>2. Connect a compatible display to <b>OUT 1</b>, select <b>Display 1</b>, then select the <b>LAN</b> input. Input selection is described on page 10. The test pattern shown below should appear on the display. If it does not, then data streamer is not running.</li> <li>3. Review <a href="#">Streaming Video and Audio</a> section that starts on page 37. Verify that a network connection has been established.</li> </ol> 
Network connectivity	<p>Network connectivity test:</p> <ol style="list-style-type: none"> <li>1. Verify that the <b>ConductOR</b> is turned on and connected to your network.</li> <li>2. From the front panel select <b>IP Streaming</b> and that the <b>Mode</b> is <b>Transmit</b>. The <b>IP Address</b> window should hold an IP address.</li> <li>3. From a PC connected to the same network as the <b>ConductOR</b>, click the <b>Start</b> button then select: All Programs &gt; Accessories &gt; Command Prompt.</li> <li>4. Type <b>ping</b> and the IP address from the unit's <b>IP Address</b> window. The response should be as shown in the screen shot below. <b>Note:</b> Your IP address may be different from the IP address in the screen shot.</li> </ol> 

## Serial Port Setup



Select the **ConductOR**'s [Information](#) screen and set the **Unit ID** to **0** before attempting to run the [Serial Port Test](#). **Unit ID** setting is discussed on page 16.

### Hardware Setup

Turn the **ConductOR** on.

Connect your PC to the **ConductOR** using a standard RS-232 (NDS P/N 35D0003 or equivalent) cable.

### Hyper Terminal Setup

The table at the bottom of this page shows the serial port parameters.

Click Start

Select All Programs > Accessories > Communications

Click Hyper Terminal

Enter a name for the new connection and click OK.

In the Connect To menu, select a COM port from the Connect using drop down menu and click OK.

In the COM Properties menu:

Set Bits per second to 19200

Set Data bits to 8

Set Parity to None

Set Stop bits to 1

Set Flow control to None

Click OK

Click File, click Properties, then select ASCII Setup from the Properties menu

In the ASCII Setup menu select:

Echo typed characters locally.

Click OK to exit ASCII Setup

Click OK to exit configuration. Click File and select Save to save the configuration.

### Serial Port Test

Place the cursor in the text area of the Hyper Terminal window and press Enter, **!0003C3** is displayed.

Type **:070100078F** and press Enter.

**!0000C0** is displayed

Type **:0000000080** and press Enter.

**!000058J0039RBBxx** is displayed. Where:

! = Start of response.

0000 = Response OK.

58J = BIOS type.

0039 = BIOS number.

R = Revision letter.

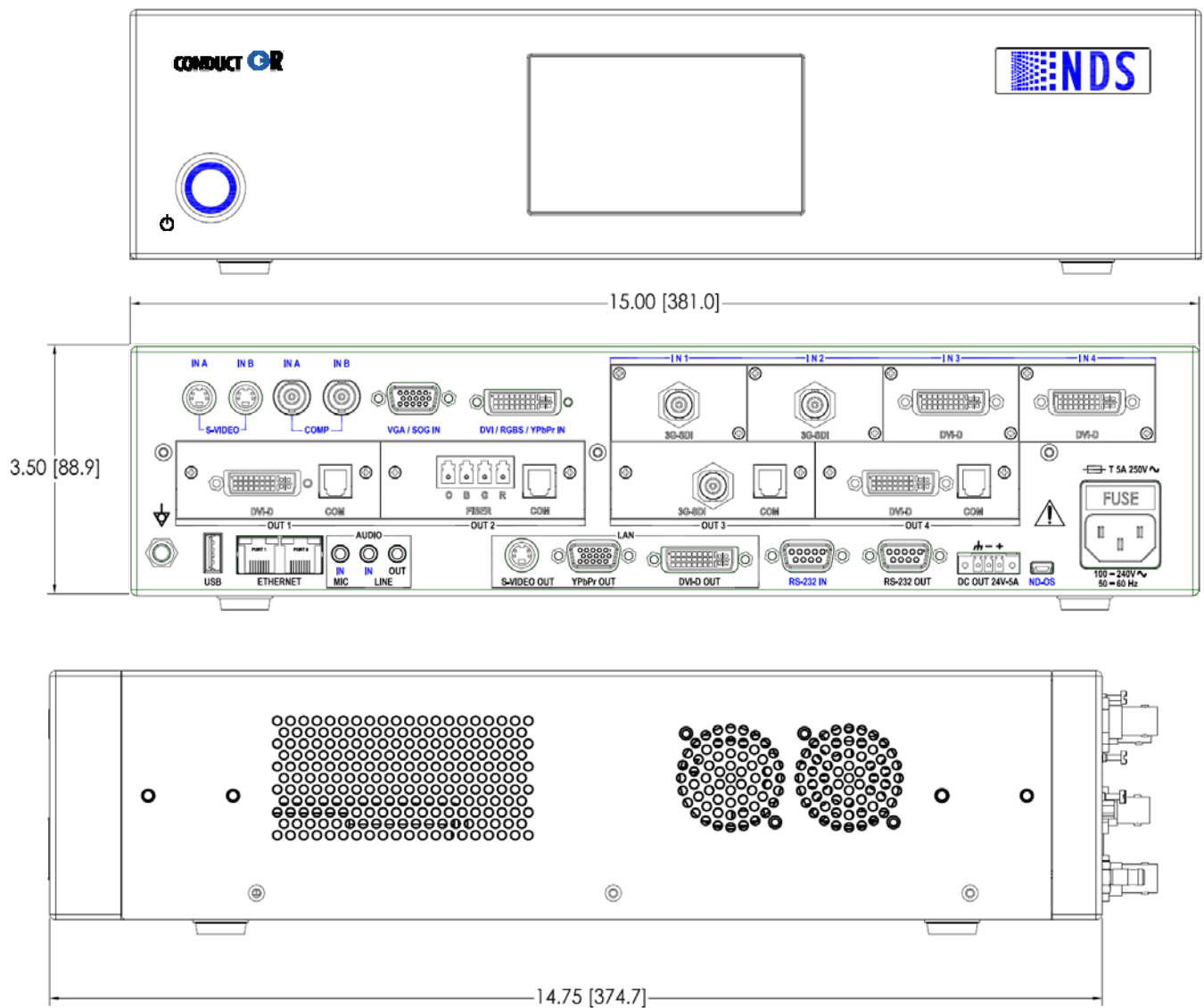
BB = Build number (minor revision).

xx = Checksum

A complete set of **ConductOR** serial commands is available. See the [General Information](#) on page 2.

Parameter	Setting
Baud Rate	19200
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None



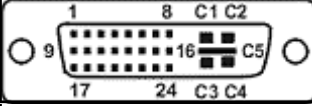




Fiber Optic	
O	Clock
B	Blue
G	Green
R	Red

VGA		
1 RED	6 GND RED	11 N. C.
2 GREEN	7 GND GREEN	12 DDC_SDA
3 BLUE	8 GND BLUE	13 HORIZ SYNC
4 N.C.	9 +5VDC	14 VERT SYNC.
5 GND	10 SYNC GND	15 DDC_SCL


S-Video		
Pin	Name	Description
1	GND	Ground (Y)
2	GND	Ground (C)
3	Y	Intensity (Luminance)
4	C	Color (Chrominance)

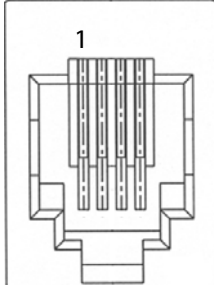
DVI-I* Digital and Analog .			
 <p><b>DVI-I</b> Supports digital <b>and</b> analog (RGBS / YPbPr). Analog data appears on pin 8 and pins, C1 through C5.            * Compliant with DVI 1.0</p>			
PIN#	SIGNAL	PIN#	SIGNAL
1	T.M.D.S. DATA 2-	16	HOT PLUG DETECT
2	T.M.D.S. DATA 2+	17	T.M.D.S. DATA 0-
3	T.M.D.S. DATA 2/4 SHIELD	18	T.M.D.S. DATA 0+
4	T.M.D.S. DATA 4-	19	T.M.D.S. DATA 0/5 SHIELD
5	T.M.D.S. DATA 4+	20	T.M.D.S. DATA 5-
6	DDC CLOCK	21	T.M.D.S. DATA 5+
7	DDC DATA	22	T.M.D.S. CLOCK SHIELD
8	ANALOG VERT. SYNC Fixed DVI IN Only	23	T.M.D.S. CLOCK+
9	T.M.D.S. DATA 1-	24	T.M.D.S. CLOCK-
10	T.M.D.S. DATA 1+	<b>Fixed DVI IN Only</b>	
11	T.M.D.S. DATA 1/3 SHIELD	C1	ANALOG RED
12	T.M.D.S. DATA 3-	C2	ANALOG GREEN
13	T.M.D.S. DATA 3+	C3	ANALOG BLUE
14	+5V POWER	C4	ANALOG HORIZ SYNC
15	GND	C5	ANALOG GROUND

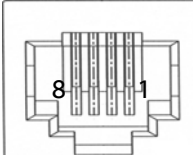
## Cable Bend Radius

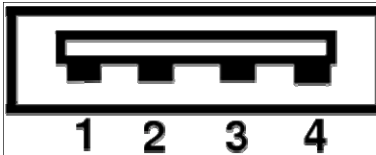


We recommend that the bend radius of metallic cables be no less than 2.5 inches (63 mm) or 7 times the diameter of the cable whichever is greater. The bend radius of Fiber Optic cables should be no less than 10 times the diameter of the cable. Sharper bends may damage the cable and / or degrade the video signal.

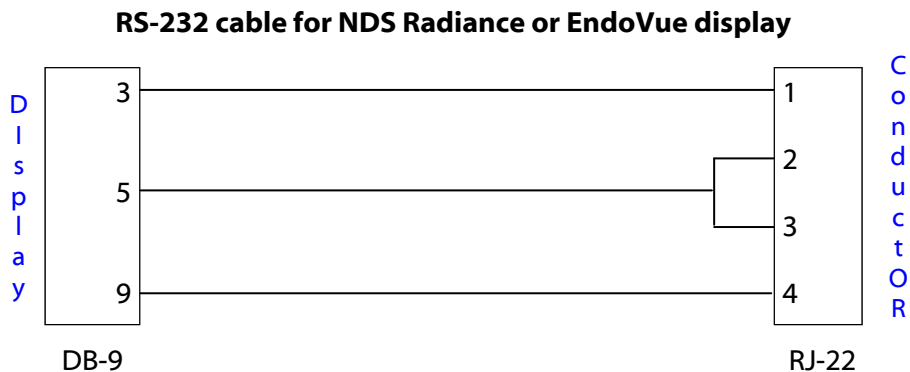
			<b>Serial Control</b>	
Pin	Name	Description		
1	NC	No Connection		
2	RXD	Data Receive		
3	TXD	Data Transmit		
4	NC	No Connection		
5	GND	Ground		
6	NC	No Connection		
7	NC	No Connection		
8	NC	No Connection		
9	NC	No Connection		

			<b>RJ-22 Output Module Serial Data Connector</b>	
Pin	Name	Description		
1	TX	Data Out		
2	GND	Ground		
3	GND	Ground		
4	Rx	Data In		

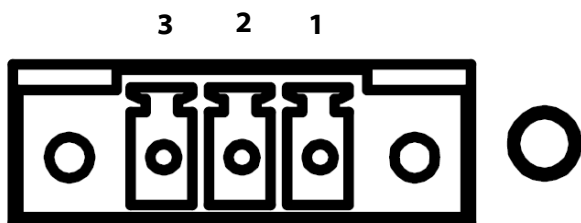
			<b>Ethernet Connector</b>	
Pin	Signal	Description		
1	TX+	Transmit		
2	TX-	Transmit Return		
3	RX+	Receive		
4	Unused	N/C		
5	Unused	N/C		
6	RX-	Receive Return		
7	Unused	N/C		
8	Unused	N/C		

		<b>USB Connector</b>	
<b>1</b>	<b>2</b>		<b>3</b>
<b>Pin</b>	<b>Name</b>	<b>Description</b>	
1	VCC	+5 VDC	
2	D-	Data -	
3	D+	Data +	
4	GND	Ground	
The USB port is used for external storage			

## ConductOR Display Control Cable



## DC Power Connectors and Pinouts

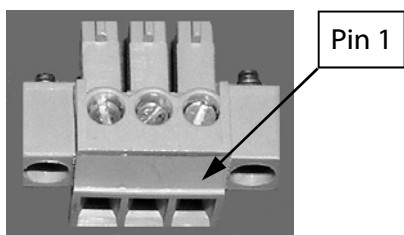


Weidmuller BL 3.81/3 connector			
Pin	1	2	3
	+ 24 VDC	GND	Chassis

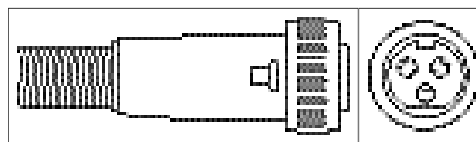
## 24 Volt Extension Cables

Use only copper wire for power wiring. Power extension cable must be constructed in accordance with applicable hospital and electrical codes. Cable should be constructed of **SJT, SJTO, SJO, ST, SO, STO** or equivalent flexible cord per US National Difference Clause 59.1DV. Users outside of the U.S. should adhere to the applicable electrical codes for their country.

The cable requires one each of the following connectors: Switchcraft SL403F (female) and Weidmuller BL 3.81/3. See illustrations below.



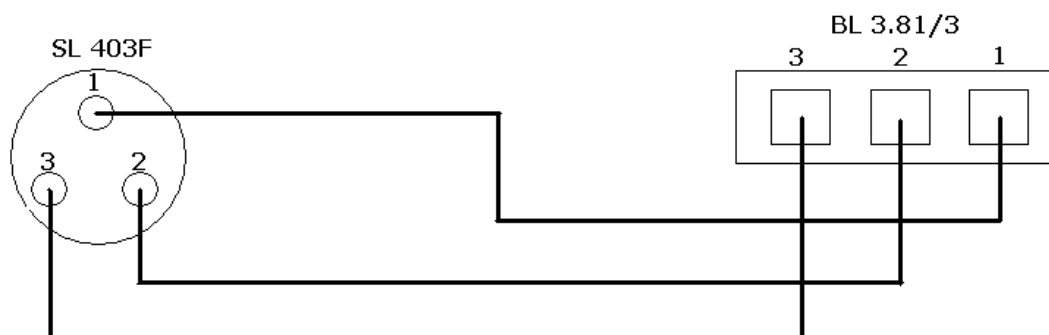
Weidmuller BL 3.81/3



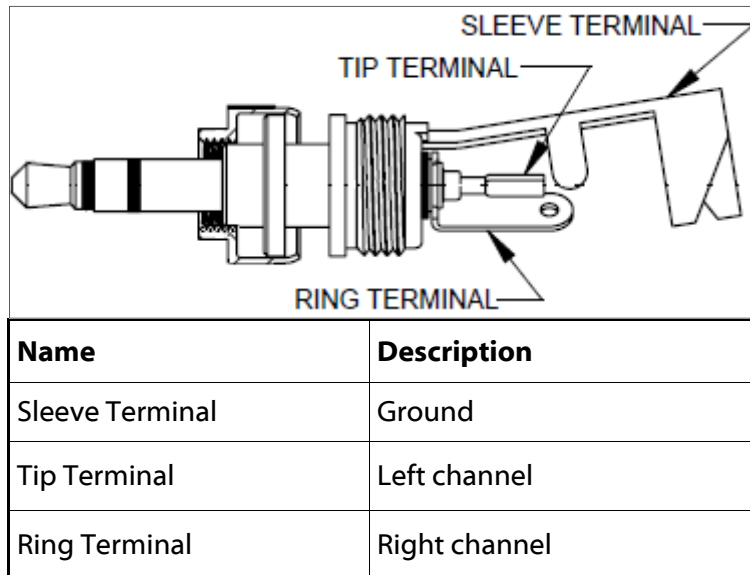
Switchcraft SL403F

Switchcraft 403F connector				
Pin	1	2	3	
	+ 24 VDC	GND	Shield	

## 24 Volt Extension Cable Schematic

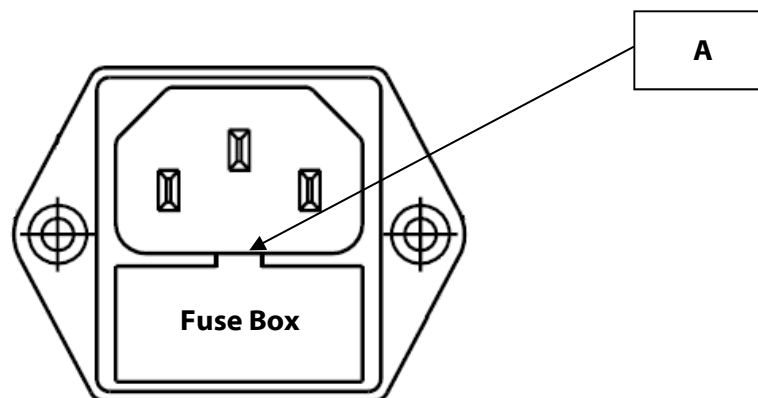


## 3.5mm Audio Plug Pinout



## Fuse Replacement

1. Disconnect the power cord from the ConductOR.
2. Using a small screwdriver at point A, pry the Fuse Box out .
3. Replace the fuse with a **Buss T5AL 250V** or equivalent.
4. Slide the Fuse Box into its receptacle and press until it seats.



## Specifications <sup>a</sup>

DVI and Fiber Output Resolution <sup>b</sup>	1920 x 1200p, 1920 x 1080p or 1280 x 720p
SDI Output Resolution <sup>b</sup>	1920 x 1080p, 1920 x 1080i or 1280 x 720p
VGA Input signal level at 75Ohms	0.7 V p-p
HD-SDI Input signal level	.8 to 2.0 V p-p
S-Video Input signal level	0.7 V p-p
Composite Input signal level	0.7 V p-p
Sync On Green (SOG)	0.7 V p-p
RGBS Input signal level	0.7 V p-p
RGBS Input Signal Sync	0.4 to 4.0 V p-p
USB Specifications	
Interface Specification	USB 2.0 , 5VDC @ 1 Amp
Format	FAT 32
Stand Alone Power Consumption (nominal)	66w <sup>c</sup>
Power 24 VDC Power Out (max)	120w
System Weight	10.5lbs (4.5 kg)
Environmental	
Operating Temperature	0 to 40°C
Operating Humidity (non condensing)	20 to 85%
Operating Altitude	6,600 ft (2,000 m)
Storage Temperature	-20 to 50°C
Storage Humidity (non condensing)	10 to 90%
Transport Humidity (non condensing)	10 to 90%
Storage Altitude	33,000 ft (10,000 m)

### Notes:

- Specifications are subject to change without notice. Contact NDS for recent specifications.
- User selectable.
- Without a load connected to the ConductOR's 24VDC output.

DVI Supported Resolutions	
Signal Parameter	Supported Range
Active Resolution (Horizontal x Vertical)	640 x 480 min to 1920 x 1200 max
Refresh Rate (Vertical Frequency)	23.98 Hz up to 85 HZ
Pixel Clock (Pixel Frequency)	25 MHz up to 165 MHz

The DVI inputs can automatically detect any valid DVI signal within the resolution, vertical refresh, and pixel clock ranges specified in the table above. Signals outside of any of the specified ranges may not be supported.

SDI Supported Resolutions					
Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)
720	480i	29.97	1280	720p	50
720	483i	29.97	1280	720p	59.94
720	487i	29.97	1920	1080sF	24
720	576i	25	1920	1080p	24
720	587i	25	1920	1080p	25
1280	720p	24	1920	1080p	29.97
1280	720p	25	1920	1080i	25
1280	720p	30	1920	1080i	29.97

VGA, RGBS, and YPbPr Supported Resolutions								
Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)
720	480i	29.97	1024	768i	43.48	1280	1024i	43.44
720	480p	59.94	1024	768	50	1280	1024	60
720	576i	25	1024	768	59.94	1280	1024	60.02
720	576p	50	1024	768	60	1280	1024	75.02
640	350	50	1024	768	64	1280	1024	85.02
640	350	60	1024	768	70.07	1280	480p	59.94
640	350	70	1024	768	75.03	1280	576p	50
640	400	50	1024	768	84.99	1294	960	59.96
640	400	70	1152	576	50	1440	900	59.94
640	480	50	1152	864	60.05	1600	1200i	48.04
640	480	60	1152	864	70.01	1600	1200	60 *
640	480	67	1152	864	75	1920	1080sF	24
640	480	70	1152	864	85	1920	1080p	24
640	480	72.81	1152	900	66	1920	1080p	25
640	480	75	1280	720p	24	1920	1080p	29.97
640	480	85.01	1280	720p	25	1920	1080i	25
720	400	70	1280	720p	30	1920	1080i	29.97
720	400	85.04	1280	720p	50	1920	1080p	50
800	600	56.25	1280	720p	59.94	1920	1080p	59.94
800	600	60.32	1280	960i	29.97	1920	1200	30 *
800	600	60.38	1280	960	59.94	1920	1200	50 *
800	600	72.19	1280	960	60	* These resolutions are <u>not</u> supported on DVI-2 or the RGB BNC connectors. They are supported on DVI-1, VGA, and SOG.		
800	600	75	1280	960	75			
800	600	85.06	1280	960	85			

Fixed Inputs	Connector Type	Input Modules	Connector Type
DVI / RGBS / YPbPr	DVI –I	DVI –D	DVI –D
VGA / Sync-On-Green (SOG)	HD-15	3G-SDI	BNC
S-video	DIN-4	VGA	HD-15
Composite	BNC, 75 Ohm terminated	S-Video / Composite	DIN-4 / BNC, 75 Ohm terminated
Output Modules			
DVI –D	DVI –D		
SDI	BNC, 75 Ohm terminated		
Fiber Optic	LC		

## Cleaning and Disinfecting Instructions



Prior to cleaning and surface disinfection, the unit should be turned **OFF** and disconnected from its power source.

### **Cleaning:**

Thoroughly wipe all exterior surfaces with a lint-free cloth that has been dampened with an acceptable cleaning agent. Acceptable cleaning materials are listed below. Remove residual detergent by wiping all exterior surfaces with a lint-free cloth dampened with distilled water.

### **Disinfecting:**

Disinfect the unit by wiping all exterior surfaces with a lint-free cloth dampened with 80% Ethyl Alcohol. Allow the unit to air dry.

### **Cautions:**

Do not allow liquids to enter the interior of the unit, and do not permit exterior surfaces to come into contact with unacceptable solvents such as those listed below, as severe damage to the unit may result.

#### **Acceptable Cleaning Materials:**

Vinegar (distilled white vinegar, 5% acidity)

Ammonia-based glass cleaner

#### **Acceptable Disinfecting Material:**

Ethanol 80 % by volume

#### **Unacceptable solvents:**

MEK (Methyl Ethyl Ketone)

Toluene

Acetone

### **Note:**

The acceptable cleaning and disinfecting materials listed above have been tested on NDS products and, when used as directed, do not harm the product's finish and or its plastic components.





## Electromagnetic Compatibility (EMC ) Tables

All medical electronic devices must conform to the requirements of IEC 60601-1-2. Precautions, adherences to the EMC guideline information provided in this manual and verification of all medical devices in simultaneous operation are required to ensure the electromagnetic compatibility and co-existence of all other medical devices prior to a surgical procedure.

The EMC tables on the next three pages are provided for your reference.

Guidance and manufacturer's declaration – electromagnetic emissions		
The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that it is used in such an environment.		
Emissions	Compliance	Electromagnetic environment-- guidance
RF emissions CISPR 11	Group 1	The product uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	
Harmonic emissions IEC 61000-3-2	Not Applicable	
Voltage fluctuations/ flicker emissions IEC 61000 -3-3	Not Applicable	

Guidance and manufacturer's declaration 211; electromagnetic immunity			
The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines	±2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) and neutral	±1 kV line(s) and neutral	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0,5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles <5 % $U_T$ (>95 % dip in $U_T$ ) for 5s	<5 % $U_T$ (>95 % dip in $U_T$ ) for 0,5 cycle 40 % $U_T$ (60 % dip in $U_T$ ) for 5 cycles 70 % $U_T$ (30 % dip in $U_T$ ) for 25 cycles) <5 % $U_T$ (>95 % dip in $U_T$ ) for 5s	Mains power quality should be that of a typical commercial or hospital environment. If a dips or an interruption of mains power occurs, the current of the product may be dropped off from normal level, it may be necessary to use uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Not applicable	Not applicable
NOTE $U_T$ is the a.c. mains voltage prior to application of the test level			




Recommended separation distances between portable and mobile RF communications equipment and the product			
The product is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the product can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the product as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power (W) of transmitter	Separation distance, in meters according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
<p>For transmitters rated at a maximum output power not listed above, the recommended separation distance <math>d</math> in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.</p> <p>NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</p> <p>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			





ISO 9001:2008 and ISO 13485:2003;  
FDA Registration # 2954921 & 1226517

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